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'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

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School Surgery.

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XII.

DISLOCATIONS.

DISLOCATIONS are terms which are applied to displacements of the bones which go to form a joint when the natural position of a bone to its fellow is altered, and the joint between them rendered useless. They may be simple, as when there is no other damage than a more or less severe rupture of the surrounding ligaments (as the bands which connect them together are called), or they may be associated with fracture of some of the bony structures which enter into the formation of the joint.

A dislocation is said to be *complete* when the end of the bone is altogether separated from its fellow which made up the joint. It is *incomplete* when it is a partial dislocation only. Dislocations are of very frequent occurrence amongst schoolboys. They are generally caused by sudden falls or severe blows, so that the force of a muscle or the direction of the blow is suddenly brought to bear upon the head of the bone, deflecting it in a direction in which there is not sufficient strength in the envelopes to resist the force. The head of the bone is in consequence forced out of its socket or resting-place. They are simple when there is no injury inflicted upon the surrounding skin or muscles. They are compound when the integuments are torn, and there is blood effused externally through an open wound. They may be associated with fracture, the bone itself being broken either in its shaft or immediately into the joint: these latter, when compound—that is, when the interior of the joint communicates with the external air—are always of most serious consequence.

There are some general symptoms which belong to all dislocations, such as pain more or less severe, according to the extent of the luxation, the injury to the soft parts, and the sensitiveness of the patient. The limb cannot be moved, or if it is moveable it is very painful to move it. There is a depression in one place and an unusual lump in another. The position of the limb is different to that which is natural to it when at rest. It should always be remembered that dislocations are more common among children as a result of a particular fall or injury. A similar fall or injury is more likely to be accompanied by fracture in old people. This arises from the fact that the bones are more brittle in age than in youth. They have more of the lime salts and fatty matter in their composition, with less gelatine, whilst the opposite holds among the young. Dislocations occur most frequently in the following order:—*The Shoulder; the Wrist, Fingers, and Thumb; the Ankle; the Elbow; the Collar-bone; the Hip; the Knee and Knee-cap; the Jaw.* There are some minor forms which are very infrequent, and some more serious, as when a vertebra, or one of the bones of the neck or back, is displaced. In the latter case it is usually accompanied by immediate death, and need not be considered here. The treatment in all kinds of dislocation is more or less similar in some of their parts, so that a few general directions may be given. The cardinal line is that all dislocations should be reduced as quickly as possible. A luxation which has existed five minutes only is a trifle compared with a similar case in which the dislocation has been unreduced for twelve hours. Every hour during which the bone remains out of place increases the mischief; inflammation arises, and with it a tendency to spasm, and to tension in the surrounding muscles. Reduce the dislocation if possible before the patient recovers from the shock of the accident; it is an easy thing to do if done at once; it becomes very serious if it be left for some time unreduced. The reduction may be effected by any one if it is recognised immediately and the right course adopted: but if left until to-morrow, it is only the surgeon who will be likely to recognise it or able to reduce it.

Dislocation of the Shoulder.—This may take place in three different directions. The head of the bone may be thrust forward upon the chest, or backward on the shoulder-blade, or downwards into the arm-pit. The elbow cannot be brought close to the side without very severe pain. There is a cavity where the roundness of the shoulder should be, and the outline is too square. If the head of the bone is forward, it will be felt as a lump on the front of the ribs; or, if backward, upon the shoulder-blade, the head is felt as a ball upon the bone, or it may have disappeared into the arm-pit. This latter is the most painful form, for the head of

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the bone is pressing upon the nerves and blood-vessels which supply the limb. These dislocations are easily distinguished in the thin boy, but not always so in the muscular or fat boy. If the dislocation is recognised at once, any one may easily reduce it by placing the patient in the recumbent position on the ground, then pulling off his boot, sitting by the side of the patient on the side which is injured, and placing the foot in the arm-pit, and forcibly pulling at the elbow downwards with both hands towards the feet of the patient. The head of the bone will go into its socket with a snap, and the patient will be comparatively comfortable at once. If this is effected immediately after the accident, there is no occasion for the jack-towel or other ligatures which are suggested in some popular manuals. The operator's foot in the arm-pit and a strong grasp of the injured arm at the elbow, with traction firmly and continuously applied, will reduce the dislocation in a very short time, unless the head of the bone or the socket of the shoulder-blade are broken. In such cases the attendance of the surgeon must be sought before the reduction will be effected; but this kind of fracture, though common to old people, is unusual to children. As soon as the reduction is effected, the arm should be put into a sling, which may consist of a silk handkerchief hung round the neck, only just supporting the fore-arm and wrist, and keeping the arm closely to the side. It is not necessary to place a pad in the arm-pit, and bandages are not required, provided the arm is not raised.

Dislocation of the Wrist and Fingers.—The wrist may be dislocated either forward or backward. It is seen at once by the position of the hand. Grasp the hand firmly, and let an assistant take the arm at the elbow and each pull gently but steadily in opposite directions. The limb resumes its natural shape. It should then be placed upon a pillow, the patient sitting at a table until a proper cradle is prepared for it. This may consist of an old book-cover, a piece of pasteboard, or bit of the leather of an old saddle (pig's skin), or a piece of gutta-percha. It should be put in hot water so as to completely soften it, then cover it with cotton wadding, and placing the injured limb upon it, mould it to the arm from the elbow to the knuckles, turning it round the outer side so as to form a kind of spout, in which it may rest when the limb is placed in a sling; bind it loosely on with a linen bandage, and allow it to dry without changing the position of the arm. It must not be put on too tightly, or it will have to be removed on account of the natural swelling which will take place. The same course should be taken with individual fingers; but in that case it is not necessary to do more than envelope the finger and its neighbour, leaving the wrist free. There may be much difficulty in reducing dislocation of the thumb, unless it is done immediately. A surgeon will have to be summoned and chloroform probably administered before a satisfactory reduction can be effected. Dislocation of the ankle is somewhat similar to that of the wrist, but it is usually something more. There are three bones contained in its formation. It is a common thing for the bones at the wrist to be broken in old people and to simulate dislocation; the rule will generally be fracture at the wrist in the aged, but dislocation in children from a similar accident; but dislocation at the ankle always has more or less of fracture in it, and should be treated, if possible, by a surgeon from the first. There may be displacement in four directions, backwards, forwards, inward, or outward. The lateral dislocations will be self-evident, but the anterior or posterior are more difficult to distinguish, the heel being more prominent than usual, or less so, with great pain on the least movement being attempted. These symptoms will be sufficient to excite suspicion as to its nature, and should lead the principal to seek for surgical aid at once.

Dislocation of the Elbow.—Three bones enter into the formation of this joint, and like the ankle it may be dislocated in four directions, and will require skilled aid to effect its reduction, as it is often associated with fracture, and is a very serious injury.

Dislocation of the Collar Bone can scarcely be treated without skilled surgical assistance. There may be dislocation either at the shoulder or at the internal extremity of the bone where it rests upon the breast-bone. In either case it will be requisite to follow the directions of a skilful surgeon as to bandages and position, although if reduced by pulling the shoulder outwards immediately, it may slip into its place and remain there, provided the arm and shoulder are fixed in that position and are not moved again for some time, a pad being placed in the armpit, and the arm bandaged to the sides.

Dislocation of the Hip is a very serious injury, but if recognised quickly it may be reduced by a non-surgical hand, and the patient saved much suffering. A trifling injury sometimes seems to produce the deformity which results from it. The limb is shortened, the knee stands forward, and the toes rest upon the instep of the other foot. It is manifest when the patient stands erect. A jack-towel or some similar article should be passed between the thighs, and fastened securely above the head to something which will give fair purchase; another towel is passed round the thigh above the knee, and secured with clove hitch or sailor's knot, and the other end of the second towel being placed round the shoulders of the surgeon, he places his heel in the groin, and grasping the limb, guides it as he makes extension until it goes into its socket with an audible snap. Every minute which elapses after the injury before reduction is effected adds materially to the pain to the patient and trouble in effecting reduction.

Dislocation of the Knee.—This accident takes place in different directions, and considerable force is required to overcome it, which must be directed by a skilled hand. It is not a very common occurrence, but dislocation of the knee-cap is not uncommon. The little bone which lies in front of the knee-joint may be dislocated to the right or left, and when recognised immediately may be easily reduced by pressing suddenly upon the edge of the bone to the outer side of the joint, so as to press down the outer side, and at the same time tilt up the inner edge, and when the muscles attached to its upper border will bring it into position. If this does not effect the purpose aimed at, the leg of the patient, who is to lie on his back, must be bent as far as possible towards the face, when the leg should be suddenly bent back upon the thigh till the heel comes near to the hip. The operator presses the rim of the bone as he quickly straightens the leg again.

All dislocations require rest; warm applications to soothen the joint; no tight bandages should ever be used, but only those appliances which give gentle support.

Dislocation of the Jaw is very alarming, but soon remedied if it is recognised at once. The victim finds himself in a moment after gaping, or a blow, with the mouth wide open and incapable of speech. He can only indicate its nature by signs. The operator seats the patient in a low chair, and wrapping some leather or other tough material around his thumbs, stands before the patient, and placing the thumbs as far back as possible on the back of the lower jaw, he depresses the jaw by pressing upon the back teeth; at the same time presses the jaw forward with the fingers under the chin. If the thumbs are not fully protected they will be severely bitten as the jaw closes, but the deformity is at once remedied. It is very likely to recur in those who have been once subject to it. The use of chloroform enables a skilled hand to reduce some kinds of dislocations much more satisfactorily than used to be the case; but its use for such a purpose can only be made by a surgeon.

Fractures, or Broken Bones.—There are some general directions regarding fractions which should be known to all persons having the care of children.

It would be a great advantage if ambulance classes were made a part of the work of school life, so that children might be taught some of those common-sense rules which, if always carried out, would diminish the incidence of misfortune by reducing it to its first consequences. It is very usual if a person steps off a curb, or falls downstairs, or from a tree, for the bystanders to endeavour to put him on his legs again. They take hold of him anywhere, perhaps by the arm, which may be broken; or lift him up by the shoulders, when, if his thigh be damaged, they complete the fracture, which may have been only partial; or they try to make him stand, and a splinter from a broken bone in the leg at once pierces through the skin, and makes a simple fracture into a compound one. By this means a comparatively trivial accident becomes a very dangerous one, and limb or life may be lost by the injudicious action of ignorant friends in thus trying to help an injured person to stand up. The first thing to be done when an accident happens is to keep the patient in the recumbent position until the nature of his injury is manifest; advise him to be still, and to indicate the part which is damaged. Limbs may be straightened by extending them, but in no case should any course be taken which may lead to shortening, and care should always be taken to prevent the completion of a fracture. A so-called green-wood fracture is easily kept in position. It is like a piece of green wood, it is still in apposition in some of its parts, and can only require lateral support to keep it in proper position, and will not shorten. When it is the leg or the thigh which is damaged, this rule is especially necessary to be observed: do as is generally done with horses when they fall upon a city pavement; keep the head down, until arrangements have been made for his safe transport by stretcher to his home. He must be raised very carefully to get the stretcher underneath him. First roll him on one side, and place one edge of the stretcher beneath him, and then roll him back very gently; or, if it be the thigh which is broken, lift him by the shoulders and the knees, keeping the latter close together, the legs bent upon the thighs, and with a roll of clothes beneath them, so that legs hook over the roll, and prevent shortening as much as possible. If it be the leg which is broken the limb should be placed upon a pillow or some other soft material, raised a few inches by it, and the foot secured so as not to allow it to roll to the right or to the left. A soft pillow is the best adjunct; when it cannot be obtained, some hay or green grass arranged as a bed will effect the object aimed at.

Fractures are—1. Simple; 2. Compound; 3. Comminuted. They are simple when there is no outward damage to skin; compound when the bone pierces through the outer skin; and comminuted when the bone is broken into several pieces. It is very important to keep the malpositions which attend a fracture within the smallest possible compass, to prevent shortening, and on no account put on any kind of bandages too tightly. A bone is generally known to be broken by the grating feeling which arises from the broken ends rubbing together, and which are quite different to any other feeling which can be conveyed to the hand of the operator. This sound is called a *crepitus*, and is quite distinctive. A broken bone should be straightened by extending the lower end until the original shape of the limb is restored. It should be secured upon or within a pillow in the case of the leg, or with soft pads in the case of the arm, until a surgeon can take charge of it. In compound fracture it is best to cover up the wound as quickly as possible with carbolised oil, so as to keep it from contact with the external air; to wrap it up in its own blood, and prevent, as far as possible, the movement of the limb until it has been properly secured.

In *Fracture of the Ribs* the treatment consists in passing a flannel bandage round the chest, so as to limit the movement of the ribs, and compel the diaphragm (that is, the muscle between the chest and the abdomen) to do most of the work of respiration. The accident is recognised by the sharp pain on inspiration, giving rise to difficulty of breathing immediately after a fall or blow.

In *Fracture of the Thigh*—a misfortune which may happen to children with brittle bones—the patient should be kept on his back, with a bolster or some similar firm support under both knees, which should be secured together until the surgeon has arranged a proper bed. Compound comminuted fractures must be treated by the surgeon as soon as possible.

In closing the second series of instructions to teachers on medical subjects, it will be manifest that it is necessarily superficial in many parts, it being only possible to indicate the nature of an injury, without further instructions. Some of the deficiencies on strictly medical points will be remedied in the subsequent numbers of the PRACTICAL TEACHER, under the head of 'The Teacher's Health.'

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Anecdotal Natural History.

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No. XXIV.—THE MARSUPIALS.

PART III.

RESEMBLING the rodents in so wonderful a degree that the presence of the marsupial pouch alone prevents it from being ranked with those animals,

the Wombat, or Australian Badger (*Phascolomys ursinus*) deserves more than a mere passing mention.

There are few creatures which appear more out of place in the situation assigned to them in the order of nature than this curious quadruped, which approaches so closely to the beaver in its structural characteristics that only a very careful examination could relegate it to its true position in the animal world. Not the slightest resemblance in outward form can we trace between the wombat and the animals which precede and follow it in the natural order, while the difference in habits is perhaps even more strongly marked. There can scarcely be a greater contrast than between the swift and agile movements of the kangaroos and the bandicoots and the deliberate ungainly pace of the wombat, whose heavy body and short limbs allow it to travel only by means of a slow and awkward waddle. And yet the presence of the marsupium indicates with certainty the true position of the animal in the scale of creation, and we can only wonder at the strange and at present inexplicable transitions which are found between the members of this curious group.

At first sight it bears a curious resemblance to the capybara of tropical America, although the wombat is essentially an inhabitant of the land, and the capybara passes much of its time in the water. The webbed feet of the former would, of course, distinguish it at once to a practised eye, but, as we shall presently see, the marsupials have their aquatic type, and produce an animal which is almost as much at home in the water as is the beaver itself.

According to the natives, the wombat, although no swimmer and never voluntarily seeking the water, does not fear it.

Not being a very intellectual animal, it can only accommodate one idea at a time in its brain. So, if it intends to make a journey, and should happen to come upon a river, it is not in the least disconcerted. Instead of being baffled by the river it goes straight into it, walks along the bed of the stream, and emerges on the other side.

If this be the case—and, as a rule, the natives are always right in their statements about wild animals—the wombat must possess, like the hippopotamus, the elephant, the whale, and the seal, the power of contracting its body so as to render itself heavier than water.

The wombat is spread over the greater portion of Australia, and is in some request for the sake of its flesh, which, although flavoured by a slight taint of musk, is yet considered to be tolerably good. It is not a large animal, the total length being about three feet, of which the head occupies some seven inches. The tail is scarcely visible, never exceeding half-an-inch in length. The fur, which is of a very hard and coarse quality, is grey, mottled with black and white, and changing to white upon the lower parts of the body.

The internal structure is very remarkable, no less than fifteen, and in some exceptional cases sixteen, pairs of ribs being found, only six of which reach the breast-bone.

As is the case with many of the smaller marsupials, the wombat possesses a remarkably mild and placid disposition, and will even allow itself to be captured without displaying any signs of anger. It is easily tamed, and seems at once to become reconciled to its new existence, seldom making any attempt at escape.

Gentle as it is at ordinary times, however, the wombat is yet subject to occasional gusts of rage, during the continuance of which it becomes a somewhat dangerous antagonist, capable of inflicting rather severe wounds with its sharp claws and teeth. These outbursts of anger, however, are generally of very rare occurrence, the wombat appearing as a rule to be one of the most apathetic animals upon the face of the earth.

In spite of its numbers, the wombat is not very often seen, except by those who go out in search of it, as it is strictly nocturnal in its habits, and seldom or never makes its appearance until darkness has fairly set in. During the daytime it conceals itself in long and deep burrows, which it excavates for itself by means of the sharp and powerful claws with which the fore-feet are provided. To such a depth are these tunnels sunk that even the natives themselves will seldom attempt to dislodge a wombat from his residence.

It is probable that the extreme length of these burrows is owing to the sensitive nature of the animal where heat and cold are concerned, the latter appearing to affect it to a wonderful degree.

This instinctive habit of burrowing renders it unsuitable for domestication. If it be placed in a yard paved so firmly that the creature cannot make a burrow, its natural conditions of life are altered, and, though it may live, it cannot be happy. It wants to burrow just as the skylark wants to soar and the swallow wants to emigrate, and neither of these creatures can be happy if their mode of life be forcibly altered.

In more than one instance, a tamed wombat has contrived to elude the vigilance of its keepers and to make a burrow. Following its instinct, it makes the burrow of very great length and depth, and when it passes underneath houses, as it has repeatedly done, the stability of these premises is seriously endangered.

The reader will remember that the natives rather shrink from the task of unearthing a wombat. To those who are acquainted with the habits of the aborigines, this statement means much.

There is no such accomplished digger in the world as your Australian 'black-fellow.'

Given a hole to be dug—dimensions and depth of no consequence—armed simply with a stick pointed and charred in the fire, the 'black fellow' will utterly vanquish the finest English 'navvy,' armed with pick-axe and shovel of the best make. The civilized man, plus his civilized implements, has to yield before a naked black savage and a stick. If the task were reversed, and an embankment had to be thrown up on level ground, the savage would be nowhere in comparison with the navvy.

But the very fact that the aborigines, who can burrow almost as fast as if they were moles, hesitate about attacking the stronghold of the wombat, speaks volumes for the tremendous burrowing powers possessed by the latter.

In spite of the difficulty of keeping the animal above ground, some twenty examples have been maintained in the Zoological Gardens, being representatives of at least three distinct species.

The food of the wombat appears to be entirely of a vegetable nature, the animal thriving in captivity upon lettuce-leaves, cabbage-stalks, and similar articles of diet. For milk it always evinces a great partiality, and has even been known to push the covers off the vessels containing the coveted beverage, and to bathe in the milk as well as drink it.

Geological researches in New Holland have resulted in the discovery of the fossil remains of an animal closely allied to the wombat, but which, when living, must have almost equalled the hippopotamus in dimensions. It is therefore, to say the least, probable that further investigations would result in the discovery of the remains of many species now extinct which would tend to throw some light upon this remarkable group of animals.

THE curious little Bandicoots (*Perameles*), easily recognizable by their rat-like aspect, are next upon our list.

The mode of progress adopted by these little creatures is very strange, consisting of a curious mixture of running and leaping, caused by the peculiar structure of the legs and feet. Notwithstanding this apparently awkward gait, however, the bandicoots can attain a tolerably high rate of speed, the more remarkable when the small size of the animals is taken into account.

The most interesting of these animals is the long-nosed bandicoot (*Perameles nasuta*), so called from the peculiar formation of the snout, which strongly reminds one of the shrew-mice of our own country, being prolonged in a precisely similar manner. The feet are armed with long and powerful claws, by the aid of which the animal is enabled to dig for the roots, etc., upon which it feeds. The fur is of a pale brown hue, pencilled with black upon the upper portions of the body, and merging into white upon the lower surface. The total length of the animal is about twenty-one inches, five of which are occupied by the tail.

The diet of the long-nosed bandicoot is stated to be entirely of a vegetable character, and to consist chiefly of the roots which it extracts from the ground by means of its long and powerful claws. That these roots form the major portion of its food we can hardly doubt, but it seems more than probable that this vegetable diet is largely qualified by the worms, grubs, etc., turned up by the animal while digging, a conjecture borne out by the shrew-like appearance of the head.

One curious species is appropriately called the Rabbit-eared Bandicoot (*Perameles lagotis*).

Several examples of this animal have been kept in the Zoological Gardens, and never failed to attract attention. Their long, semi-transparent ears, and their peculiar tripping gait, which really looked like affectation personified, distinguished the little creatures from their surroundings.

THE pretty little Chæropus (*Chæropus castanotis*) is evidently closely allied to the bandicoots, from which it differs chiefly in the formation of the fore-paws, which bear a curiously close resemblance to those of the swine. These feet are formed with two toes only, each of which is armed with a hoof-like claw, the result being a wonderfully exact likeness in miniature to the foot of the pig.

The chæropus is a native of New South Wales, inhabiting the thick and tangled vegetation popularly known as 'scrub.' It is a rather curious animal in appearance, possessing, although in a less striking degree, the elongated snout of the long-nosed bandicoot, while the ears are of enormous dimensions in comparison with the size of the body. The fur, which is of a remarkably woolly texture, is of a pale brown hue, fading almost to white upon the lower parts of the body. It is but a small animal, being about equal size to the ordinary English rabbit.

By way of a habitation, the chæropus constructs a rather elaborate nest of grass and leaves, generally selecting the base of some bush as the situation for its domicile. The little animal appears to take the greatest pains to conceal its abode from all excepting itself, and generally succeeds so well in its endeavour that none but a practised eye can detect the hidden nest.

SEEMING to be the principal marsupial representative of the carnivora, the Tasmanian Wolf (*Paracyon cynocephalus*) next claims our notice.

This animal really presents a wonderfully wolf-like appearance, and well deserves its popular title.

Even the feet are formed in precisely the same manner as are those of the animals of the dog family, being furnished with short and blunt claws only, and therefore not suited for climbing trees, as are those of most of the previously described marsupials. Indeed, but for the tail, which is long and tapering, the Tasmanian wolf might really be imagined to belong to the group of animals from which it derives its title.

The nature of the food of this animal is at once evident from the structure of the teeth, which are sharp and pointed just as are those of the carnivora themselves. Yet the animal is by no means as predaceous as might be expected, seeking its prey chiefly among the smaller animals, molluscs, and even insects. The sea-shore appears to furnish it with a large proportion of its food, the mussels, crabs, and other small creatures so plentiful upon the coast seeming to form a very favourite article of diet.

Few things in the way of food, however, seem to come amiss to the Tasmanian wolf, which has even been known to swallow the echidna itself, in spite of the sharply-pointed spines which radiate upon all sides of the body. The duckbill, too, often falls a victim to its attacks, notwithstanding its powers of swimming, and the long and tortuous burrow in which it makes its habitation.

Nor does the Tasmanian wolf despise larger game, contriving to capture the bush kangaroo in spite of its superior speed and activity. The flocks, too, of the settlers frequently suffer very severely from its attacks, so much so that many of the earlier colonists found it an utter impossibility to preserve their herds until the Tasmanian wolves had been driven from the neighbourhood. And this proved by no means an easy task, for, even when the greater number of the destructive animals had been killed, the remainder used to prowl round the settlements, in order to pick up any straggling animal that might fall in their way.

At the present time, owing to the constant persecution to which it has naturally been subjected, the Tasmanian wolf is a comparatively scarce animal, and is seldom seen except in those retired districts in which it has taken refuge. It seems principally to abound upon the summits of the western mountains, at an elevation of three or four thousand feet above the level of the sea, and appears to thrive in its lofty haunts, notwithstanding the inclemency of the climate during the greater part of the year.

Like most of the marsupials, the Tasmanian wolf is a nocturnal animal, concealing itself during the daytime in some deep crevice in the rocks to which the detested light cannot penetrate. In this gloomy

retreat are produced the young, usually three or four in number, which are there secure from the attacks of almost any enemy until they are sufficiently strong to care for themselves.

In point of size, the Tasmanian wolf is about equal to an ordinary jackal, attaining to an average length of about four feet, fifteen or sixteen inches of which are occupied by the tail. It is said, however, that some specimens are of far larger dimensions, six feet being mentioned by some writers as a not unusual length. The marking of the fur is rather striking, the ground-colour being a greyish-brown, while a series of black stripes cross the back from the shoulders to the root of the tail. These stripes, which are small and narrow at first, gradually increase in length until they reach the haunches, diminishing again as they approach the tail. On account of these stripes, the animal is often known by the title of Zebra Wolf.

The marsupial bones are not developed in this animal, their position being only indicated by cartilage.

FEROCIOUS alike in aspect and in disposition, few animals better deserve their popular title than the Tasmanian Devil (*Diabolus* [or *Dasyurus*] *ursinus*). Utterly unamenable to kindness, the animal seems to be one of the very few which are hopelessly untameable, flying even at the very hand which supplies it with food. Nor does its appearance belie its character, for it is as savage-looking a creature as can well be imagined.

Jet black in general hue, the body is marked here and there with spots and dashes of white, which afford a very striking contrast to the sombre ground-colour of the rest of the fur. Across the breast runs a white mark, varying considerably in size and shape in different individuals, while a second similar, although smaller, patch is generally to be found near the base of the tail. Behind the eyes is placed a tuft of very long hairs, while a second is found immediately above them.

The animal is of a rather clumsy build, and, except when under the influence of its easily-aroused passions, is generally very sluggish in its movements. It is not a very large animal, being very short-legged, and averaging about twenty-eight inches in total length, of which the tail occupies one-fourth.

Notwithstanding its small size, however, the Tasmanian devil is almost as destructive as the last-named animal, its extreme ferocity appearing to compensate for its inferiority in size and strength. Farmyards suffer greatly from its depredations, which are of almost nightly occurrence until it is driven from the neighbourhood. Indeed, the animal appears to possess one good quality, namely, that its flesh is sufficiently tender and well-flavoured to be in some request, and is by some even considered as a dainty.

In captivity it is a treacherous sort of creature. Nowhere are animals treated more lovingly than in the Zoological Gardens, or their instincts more carefully studied, and consequently there are but few animals which are not brought to acknowledge the kindly influence of man. The Tasmanian devil is one of these beings, a fact of which I have had practical experience. Some years ago, being engaged in a series of magazine articles upon the Zoological Gardens, I was permitted to enter many of the enclosures. On one occasion I fortunately happened to look round rather sharply, and was just in time to avoid a severe injury. A Tasmanian devil had stolen silently behind me, and had just got one of my ankles into its jaws. With the side of the other foot I caught it in the ribs and sent it rolling and over in a paroxysm of fury, and before it had recovered its feet I slipped out of the enclosure.

The jaws of this animal, which open very far back, and are armed with sharp and powerful teeth, are quite as formidable as those of the badger, and, if possible, it fights even more fiercely, the passion of rage seeming to be predominant in its nature, and that of fear to be wholly wanting.

The Tasmanian devil usually makes its retreats in the thickest recesses of the forests, generally digging for itself a deep burrow in which it may avoid the unwelcome light of day. The fore-feet are admirably suited for these fossorial operations, as they are furnished with sharp and powerful claws, which tear up the earth in a wonderfully short space of time.

The hinder-feet are formed very much like those of the bear, this structure giving rise to the specific title of *ursinus*. Like those animals, the Tasmanian devil can sit upon its hinder feet, and manipulate food, etc., with the fore-paws, which it uses with remarkable dexterity.

THERE are many other Dasyures, of which the Common Dasyure (*Dasyurus viverrinus*) will serve as a type. This animal, although by no means of large dimensions, is yet of very striking appearance, the dark blackish-brown fur being diversified with large white spots, varying in size and position in almost every individual. The tail, which is not prehensile, is moderately long, and is thickly covered with hair; hence the title of *Dasyurus*, or 'hairy-tailed,' which has been applied to these animals.

The dasyures are nocturnal animals, and generally pass the hours of daylight hidden away in the hollows of some decaying trees, whence they issue after nightfall in search of prey. This consists chiefly of the smaller quadrupeds, birds, insects, etc., as well as of the various molluscs and crustacea to be found upon the sea-coast, which appears to be a favourite haunt of these animals.

The feet of the dasyures are furnished with strong curved claws, which enable them to run with wonderful ease amongst the branches of trees. Upon the hinder paws the thumb is entirely wanting.

In spite of its small dimensions and harmless appearance, the little Phascogale (*Phascogale penicillata*) is one of the most destructive of all the marsupials. No house or farmyard is safe from its attacks, if the smallest aperture be left for its admission, for it contrives to insinuate its body in some wonderful manner through an opening scarcely large enough, apparently, to allow even the head to pass. And, moreover, its scandent powers are so great that it can ascend a perpendicular wall, provided only that there be the smallest inequality into which the claws can be thrust.

Once having obtained admission to a house or farmyard, the mischief worked by the little animal is almost incredible. Poultry, in particular, appear to suffer very greatly from its ravages, the fierce little creature seeming to find pleasure merely in the act of killing, and generally slaying far more birds than it can possibly devour.

Even by man himself the phascogale is not easily overcome, its sharp claws being capable of inflicting

wounds of a severity quite disproportioned to the size of their owner. An unarmed man, indeed, although he would probably eventually prove the victor, would certainly suffer very severely if he were imprudent enough to attack one of these animals.

The phascogale usually selects for its habitation the hollow trunk of some tree, in which the young are brought forth and nurtured. It is not so strictly nocturnal in its habits as are most of the marsupials, and, although generally preferring to seek its food after night has set in, is yet frequently to be noticed at large during the hours of daylight.

This little animal is only seventeen inches in total length, of which at least half is occupied by the tail, so that in actual bulk it is scarcely larger than an ordinary British rat. The colour of the fur is a light grey, the tail, however, which is adorned for the greater part of its length by a fringe of long hairs, being of a jetty-black. Owing to the tufted tail, the animal is often known as the Brush-tailed Phascogale.

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Science Notes.

M. PASTEUR'S INVESTIGATIONS.—At the last meeting of the Academie des Sciences, in Paris, a paper was read by M. Pasteur, in which he gave an account of a remarkable series of experiments on a large scale, which completely establish his views as to the efficacy of vaccination or inoculation as a preventive against splenetic fever among the lower animals. Work on this subject, it is well known, has occupied M. Pasteur for many years, and his investigations have pointed clearly to the prevention of many diseases by similar means to those adopted at present only against smallpox. It appears from his paper that the farmers in the Department of the Eure-et-Loire were so struck with the conclusive results of the experiments made in 1880-81 on animals with regard to splenetic fever that they determined to try the suggested remedy. In the course of the past year nearly 80,000 sheep, between 4,000 and 5,000 head of cattle and 500 horses have been vaccinated, with the following results:—The number of sheep vaccinated within the year was 79,392. For the last ten years the average annual loss from liver rot has been 7,327, or 9 per cent. Since the introduction of vaccination this loss has been reduced to 518, or ·65 per cent. Among the flocks which were only partially vaccinated, there were 2,308 sheep vaccinated and 1,659 not, and the loss among these was only eight among the vaccinated, while it was sixty among the unvaccinated sheep, making the percentages respectively ·35 and 3·7, or rather more than ten times as great in the latter case. These sheep were brought from different parts of the department, and those vaccinated were fed and treated exactly in the same way as those not vaccinated, so that local causes can have played no part in bringing about the results. Coincidently with these experiments on the sheep, 4,562 head of cattle were vaccinated; only eleven of these died from fever, so that the rate of mortality among them from this cause, which was 7 per cent. a year ago, has been brought down to ·24 per cent. With regard to horses, the experiments were not on so large a scale, but 524 were treated, of which number only three died. These experiments clearly establish the value of M. Pasteur's work, and raise it from a position of scientific interest to one of great practical importance in these days of agricultural depression. M. Pasteur is at present engaged in working out the nature of hydrophobia, with a view to ascertaining whether anything can be done to render this scourge less deadly. His experiments lead him to believe that one, at least, of the forms of rabies can be much mitigated in severity by a similar process of inoculation.

* * * * *

A UNIFORM INTERNATIONAL MERIDIAN.—It is announced from the United States that the Government have decided to take the initiative in promoting measures for adopting a uniform international meridian. The inconvenience of the present system has long been felt. The English meridian is taken as that of Greenwich, the French one as that of Paris, and so on; and now that railways and steam navigation have so enormously developed, this confusion of longitude according to nationality is of the greatest inconvenience to commerce. There has been considerable stir in America upon the point both in commercial circles and among the learned societies. It is, in fact, to the latter that the credit is due of having brought the Government to the point of taking the matter up.

* * * * *

KELWAY'S ELECTRIC LOG.—During some recent trials of Kelway's electric log on board of the steam-tug *Pixie*, a number of runs gave a mean of 7·2724 knots passed over by the vessel. Actual measurement of the distance showed it to be 7·2768 knots. The electric log, therefore, gives an error of only ·06 per cent., or about a yard in a mile, which is probably the nearest approach to accuracy that has ever been obtained by any log yet tried.

* * * * *

THE RENOVATION OF OLD POSTAGE STAMPS.—Mons. Naquet, the well-known French professor of chemistry, has been making experiments on the possibility of removing the defacing marks put upon stamps by the Post Office. The French Minister of Posts and Telegraphy has brought the loss to the revenue occasioned by such renovation before the Chamber, which has appointed a commission to investigate the matter, and M. Naquet is a member of this commission. His own experiments are interesting. He found that neither solution of ether, carbonic disulphide, boiling oil, gum, nor collodion produced any

effect upon the material used to deface the stamps. The alkalies, however, produced a different result. Concentrated solution of potassium, into which he dipped the stamps, made them almost perfectly white, but still the obliterating marks were visible. A much weaker solution of the same metal, however, acted on the defacement, and left the colour of the stamp almost unaltered. M. Naquet rubbed the surface of the stamps with his finger moistened with the alkaline liquid, and then washed them thoroughly in fresh water. By this means they were made to appear new; in fact, so closely did they resemble unused ones that some which he used afterwards, to see if they would attract attention at the Post Office, escaped notice altogether.

* * * * *

EXPLORATIONS IN ALASKA.—The *Vossische Zeitung* reports the return of a German traveller, Dr. Krause, from a journey in the Tschuktsh Peninsula and Alaska, undertaken at the instance of the Bremen Geographical Society. Dr. Krause crossed the Pacific with his brother from San Francisco in a small schooner, and landed in Lawrence Bay in 1881. They continued their explorations partly by land and partly by water in a whale boat, taken for the purpose, for eight weeks. In the winter of the same year they spent some time at Chilkoot, a trading port of the North-west Trading Company, under about the 59th degree of north latitude, and 135th degree west longitude, and during their stay a series of natural history and ethnographic observations were made during excursions undertaken at various periods among the Thlingit Indians. Dr. Krause remained in Alaska till last autumn, returning to New York on his way back to Germany. He will shortly deliver lectures in Bremen on his travels, and will exhibit the very fine collection of natural history specimens and other interesting objects which he has brought home with him from Alaska.

* * * * *

CHEESE PREPARED FROM BEANS.—It has long been known that very curious, and to European ideas very unattractive, viands find prominent places on the tables of the natives of China and Japan. The latest importation from these regions is one which may possibly commend itself more to our tastes than many of which we have had accounts. It is a kind of bean which, besides being cooked and eaten like other vegetables, is capable of being made into what is said to be very excellent cheese, possessing a very delicate flavour, which distinctly recalls that of Parmesan. In its composition it more closely resembles animal food than any other vegetable known to us, containing a considerable quantity of fatty matter, and much albumen. Besides being likely to form a part of our own food supply, it will afford fodder for horses and cows, which are said to be very fond of the husk. It requires for its cultivation a fairly high temperature and a tolerably constant climate, so that it is not likely to be cultivated in England, but the south of France seems to afford a suitable home for it.

* * * * *

VEGETABLE BUTTER.—Mr. N. Jepson, a prominent English vegetarian, has, in consequence of his unwillingness to use poor and adulterated animal fats for butter, sought a substance in the vegetable kingdom that may replace them. He says that he has found such a one in a composition made as follows:—Four ounces of finest Brazil nuts are pounded very fine, and, with an equal weight of pure olive oil, are rubbed into a smooth jelly. To this, eight ounces of finest wheat flour and a quarter of an ounce of salt are added, and the whole rubbed into a smooth paste, which can be used for butter.

* * * * *

THE FLATTERS' EXPEDITION.—The sad fate of Colonel Flatters and his associates, who were engaged in the important work of surveying the proposed route of the trans-Saharian Railway, has been commemorated by the Paris municipal authorities, by the erection of a handsome monument in the park of Montsouris. It will be remembered, that while they were engaged in the objects of the survey, they were murdered at Brama with all their escort, by Tonaregs, on the 16th of February, 1881. The monument, in addition to the names of the members of the ill-fated expedition, contains the legend: 'For France they braved perils and death;' and on its sides are inscribed, 'Honour and Country,' and 'Science—Civilisation.'

Recent Inspection Questions.

[*The Editor respectfully solicits contributions—all of which will be regarded as* STRICTLY PRIVATE—*to this column. For obvious reasons, it cannot be stated in which district the questions have been set.*]

Arithmetic.

STANDARD I.

37	778 82
906	
8	696 Ans.
577	
56	103 36
1584 Ans.	67 Ans.

STANDARD II.

A.	B
3659 84 307356 Ans.	17138 8950 8188 Ans.
15012 7961 7051 Ans.	8)36872 4609 Ans.
7)25956 3708 Ans.	3659 48 175632 Ans.

STANDARD III.

(1) Add up £84 19s. 10¾d.; £6 17s. 8½d.; 9s. 5¾d.; £8 17s. 6¾d.; £905 14s. 11½d.
Ans. £1006 19s. 7¼d.

(2) From £5014 17s. 0¼d. take £892 18s. 10½d.
Ans. £4121 18s. 1¾d.

(3) In a battle where 50,500 soldiers were engaged, 2927 were killed. How many survived?
Ans. 47,573.

(4) Divide 793,506 by 98. Ans. 8097.

(5) Multiply the number of days in September, October, and November by 106. Ans. 9646.

STANDARD IV.

(1) Divide fifty-eight pounds two shillings and sevenpence halfpenny by fifty-nine.
Ans. 19s. 8¼d.—51.

(2) How many boxes of sardines will it take to weigh 100,000 cwt., if each box contains 6 ozs.?
Ans. 29,866,666+4 ozs. left.

(3) Multiply fifty-nine pounds fifteen shillings and ninepence by fifty-nine. Ans. £3527 9s. 3d.

(4) There are 59 boys in a school. How much will it take to provide them with reading-books at 10d., atlases at 2s., histories at 9d., and copy-books at 2½d. each? Ans. £11 3s. 8½d.

(5) How many miles are there in 60,720 feet?
Ans. 11½ miles.

STANDARD V.

(1) A bill:—

	£	s.	d.
½ bushel of apples at 8½d. per gallon	= 0	2	10
15 dozen pears at 1½d. each	= 1	2	6
½ cwt. of grapes at 6d. per lb.	= 1	8	0
Ans.	£2	13	4

(2) 78 hhd. 15 gal. 3 qt. 1 pt. at £4 10s. per hhd. (beer measure). Ans. £352 6s. 5½d.

[N.B.—Hogshead, being an obsolete measure, ought not to have been given, unless its equivalent in gallons (54) were also given.]

(3) If 356 articles cost £109 9s. 3d., how much must I give for 2848? Ans. £875 14s.

(4) 56 yds. 2 ft. 11 in. at 2s. 3d. per yd.
Ans. £6 8s. 2¼d.

(5) A bill:—

	£	s.	d.
57 pairs of boots at 15s. 10½d. per pair	= 45	4	10½
57 " " 9s. 11d. "	= 28	5	3
500 laces at 1½d. each	= 3	2	6
Ans.	£76	12	7½

(6) 47 articles at £79 15s. 10¾d. each.
Ans. £3750 7s. 1¼d.

STANDARD VI.

(1) A road 5 miles long required water-pipes laying. If each pipe is 6 ft. 6 in. long, and 100 pipes are laid, what fraction of the road is left without pipes? Reduce the fraction to its lowest terms. Ans. $\frac{5}{8}\frac{1}{2}\frac{3}{5}$.

(2) Multiply ·003 by ·039, and divide the product by 130. Ans. ·0000009.

(3) If a man bought 2250 oranges at 15 pence per score, and sold half of them at 3 for 2½d., and the remainder at 9d. per doz., what did he gain?
Ans. 7s. 9¾d.

(4) If a train travelled 34 miles 5 fur. in 5 hrs. 20 min., how many miles would it travel in the return journey in 4 hrs. 10 min.? Ans. $27\frac{13}{88}$ miles.

Mathematics.

STAGE I.

EUCLID I. 11 AND 13.

(1) Add $8a^2-9x^2+5+7a^2+4x^2-3-11a^2$.
Ans. $4a^2-5x^2+2$.

(2) From $a^3+3a^2b+3ab^2+b^3$ take $a^3-3a^2b+3ab^2+b^3$.
Ans. $6a^2b$.

(3) $\div a^4-81b^4$ by $a-3b$.
Ans. $a^3+3a^2b+9ab^2+27b^3$

STAGE III.

EUCLID I. 37, AND II. 3 AND 6.

(1) $\left.\begin{aligned}\frac{5x}{9}+\frac{9}{y}&=11\\ \frac{5y}{9}+9x&=167\end{aligned}\right\}$ Ans. $x=18, y=9$.

(2) $\sqrt{a^2+b^2+c^2+2ab+2ac+2bc}$.
Ans. $\sqrt{(a+b+c)^2}=a+b+c$.

(3) Find G.C.M. of x^4-a^4 and $x^3+bx^2-a^2x-a^2b$.
Ans. x^2-a^2.

(4) Reduce to its simplest form $\frac{x^2-9x+20}{x^2+6x-55}$.
Ans. $\frac{x-4}{x+11}$.

Grammar.

STANDARD II.

Point out the nouns in the following: 'James ran into the garden and plucked a flower for his sister Mary.'

STANDARD III.

Nouns, verbs, and adjectives in the following: 'America is only slowly recovering from the effects of the Civil War into which it was plunged by the force of patriotic impulses.'

STANDARD IV.

Parts of speech in the following sentence: 'It is a familiar fact that Belgium is more densely populated than any other European country, and if it is a source of happiness that a dense population should be largely composed of landowners, Belgium possesses this advantage in a most remarkable degree.'

STANDARDS V. AND VI.

To analyse sentences, of which the following was the first given: 'David Livingstone, the African missionary, was born at Blantyre, near Glasgow.'

Dictation.

STANDARD I.

Busy, straw, chicken, shell, kneel, useful, cloth, fresh.

STANDARD II.

As you may suppose, the miner's life is not a pleasant one, neither is it free from danger. Sometimes they are stifled by foul air or drowned by a sudden rush of water.

STANDARD III.

There are few vegetables that do not contain sugar at some time or other of their lives. Carrots, turnips, and parsnips contain sugar; and from all these wine can be made. Starch, you know, can be changed into sugar, and so can linen rags.

STANDARD IV.

'Mercury is the heaviest of fluids, and it never freezes except under the extreme cold of the Polar regions. These properties have led to its use in barometers, as a measure of the weight of the atmosphere. At the same time, the readiness with which it expands with heat and contracts with cold adapts it well for being used in thermometers. Other uses of mercury are in gilding and silvering copper, and in plating glass for mirrors.'

Pupil Teachers' Literature.

BY AN INSPECTOR.

For Pupil Teachers at end of First Year. 66 *lines.*

[N.B.—Where the lines of Poetry are as short as this, it is usual for Inspectors to require more than the bare amount fixed by the Code.]

LUCY GRAY; OR, SOLITUDE.

OFT I had heard of Lucy Gray:
And, when I crossed the wild,[1]
I chanced to see at break of day
The solitary[2] child.

No mate,[3] no comrade, Lucy knew;
She dwelt on a wide moor,
The sweetest thing that ever grew
Beside a human door.[4]

[1] *The wild*, the moor.
[2] *Solitary*, lonely.
[3] *Mate*, companion.
[4] *Beside a human door.* The girl is said to have grown up 'beside' or outside the door of a human being's dwelling, as she spent so much of her time in the open air.

You yet may spy[5] the fawn[6] at play,
The hare upon the green;
But the sweet face of Lucy Gray
Will never more be seen.

'To-night will be[7] a stormy night—
You to the town must go,
And take a lantern, child, to light
Your mother through the snow.'

'That, father, will I gladly do;
'Tis scarcely afternoon—
The minster clock[8] has just struck two,
And yonder is the moon!'

At this the father raised his hook,[9]
And snapped the fagot-band;[10]
He plied his work:[11]—and Lucy took
The lantern in her hand.

Not blither[12] is the mountain roe:[13]
With many a wanton[14] stroke
Her feet disperse[15] the powdery snow
That rises up like smoke.

The snow came on before its time:[16]
She wandered up and down;
And many a hill did Lucy climb,
But never reached the town.

The wretched parents[17] all that night
Went shouting far and wide;
But there was neither sound nor sight
To serve them for a guide.

At daybreak on a hill they stood
That overlooked the moor,
And there they saw the bridge of wood
A furlong from their door.

They wept, and turning homeward, cried,
'In heaven we all shall meet;'—
When in the snow, the mother spied[18]
The print of Lucy's feet.

[5] *Spy*, peep at, watch from a hiding-place.
[6] *The fawn*, the young deer.
[7] *To-night will be*, etc. Lucy's mother had probably gone marketing to the town, and noticing that the night threatened, her father tells the girl to take a lantern to meet her and light her home.
[8] *The minster clock*, the clock of the min(i)stry (place of worship), church or cathedral. Thus York Cathedral is called York *Minster*, and the word also occurs in West*minster*.
Notice how cheerfully the child obeys—nay, how eagerly she makes light of the duty by pointing out how early it is, and how the moon already promises a bright, if stormy night.
[9] *His hook*, his bill-hook, an instrument like a sickle for cutting brambles and so forth.
[10] *The fagot-band*, the coarse grass or reed that bound up his fagots.
[11] *Plied his work*, went on with his work.
[12] *Not blither*, not gayer, more sportive.
[13] *Roe*, deer.
[14] *Wanton*, frolicsome.
[15] *Disperse*, scatter.
[16] *Before its time*, *i.e.*, before it was expected.
[17] *The wretched parents.* We must suppose Lucy's mother to have found her way home, and then to have started with her husband in search of their child.
[18] *Spied*, caught sight of.

Half breathless[19] from the steep hill's edge
They tracked the footmarks small,
And through the broken hawthorn hedge,
And by the long stone wall;

And then an open field they crossed—
The marks were still the same;
They tracked them on, nor ever lost;[20]
And to the bridge they came.

They followed from the snowy bank
Those footmarks one by one,
Into the middle of the bank,
And further there were none!

Yet some maintain[21] that to this day
She is a living child,—
That you may see sweet Lucy Gray
Upon the lonesome wild.

O'er rough and smooth[22] she trips along
And never looks behind;
And sings a solitary song,
That whistles in the wind.

It is most pathetic to think that after all the poor child had very nearly found her way home again, had indeed half crossed the bridge a furlong from her door, after wandering across the wide moor as far as the steep hill down which she had passed in safety. We may imagine the feelings of the parents as they trace her footmarks along the edge of the precipice and through the snowdrifts, and believe them to have almost breathed again when they see her steps now tending so near home; indeed, we can suppose them almost trusting to find their darling safe in their cottage again.

But the bridge now confronts them, and their fears are redoubled, when they notice that Lucy's footmarks lead towards it. A few steps more and they stand upon the bridge looking down into the snow-swollen torrent that has swept their darling for ever from their sight.

NOTE AS TO THE RECITATION.

In recitation there should be a good pause after the first verse, as the poem then passes from a personal reminiscence to a narrative in which the speaker has taken no part. The 2nd and 3rd verses should be said with tenderness, which should pass into deep feeling with the 11th and 12th lines.

Verse 4 should be said slowly and kindly, verse 5 quickly and eagerly, verse 6 quietly, verse 7 brightly. A pause should follow this verse, and the rest of the poem should be recited in a manner expressive of the alternations between anxiety and despair, and then again between hope and fear. Verses 12 and 13 should be said very rapidly and almost breathlessly, and verse 14 should be repeated very sadly and slowly, and there should be a long pause before its last line.

[19] *Half-breathless*, losing their breath, through hurrying so fast.
[20] '*Nor ever lost*,' nor ever lost (them).
[21] *Maintain*, 'affirm,' 'state their belief.'
[22] *O'er rough and smooth*, over rough and smooth (places).

For Pupil Teachers at the end of the Second Year.
84 lines. (80 required.)

'A PERFECT WOMAN.'

BY WILLIAM WORDSWORTH.

SHE was a phantom[1] of delight
When first she gleamed upon my sight;
A lovely apparition, sent
To be a moment's ornament;[2]
Her eyes as stars of twilight fair;
Like twilight's, too, her dusky hair;
But all things else[3] about her drawn
From May-time and the cheerful dawn;
A dancing shape, an image gay,
To haunt, to startle, and way-lay.[4]

I saw her upon nearer view,
A spirit, yet a woman too!
Her household motions light and free,
And steps of virgin liberty;
A countenance in which did meet
Sweet records, promises as sweet;
A creature not too bright or good
For human nature's daily food;
For transient[5] sorrows, simple wiles,[6]
Praise, blame, love, kisses, tears, and smiles.

And now I see with eye serene
The very pulse of the machine,
A being breathing thoughtful breath,
A traveller between life and death;
The reason firm, the temperate will,
Endurance, foresight, strength, and skill;
A perfect woman,[7] nobly planned,
To warn, to comfort, and command;
And yet a spirit still, and bright
With something of angelic light.

How exquisitely the poet reverts to this spiritual aspect of his heroine, and how, as he parts from her, he illumines her image with the purest homage man could pay to woman.

NOTE AS TO THE RECITATION.

The general line of thought in the below notes indicates the expression to be given in the recitation of the poem. The first stanza should be given brightly and yet tenderly; the second with quiet enjoyment, touched with playfulness in the last four lines. The last stanza should be earnestly rendered as far as the seventh line, where the thought becomes more exalted and where admiration of expression should pass into a tone of gentle reverence.

[1] The words *phantom* and *apparition* here have the same meaning, *i.e.*, that of a beautiful appearance, so fair, as to seem supernatural.

[2] *A moment's ornament.* She was so little seen, that she is spoken of as merely giving brightness to a moment. Her eyes are compared to the soft stars of evening, not to the brilliant ones of night, her hair to the shadows of twilight. It would appear, therefore, that she was dark haired, and brown or violet eyed.

[3] *All things else;* her blush and smile and sunny nature partake of the bright beauty of daybreak and the month of May.

[4] *To way-lay*, here, to lie in wait for.
She has hitherto only been seen in moments of leisure and light-heartedness. But in her home-life she proves to be a true woman, as well as with somewhat angelic about her; cheerfully doing her duty, and her face expressive of habitual kindness; yet she is not so spiritualized as to be above being interested in every-day life, or superior to its errors and infirmities.

[5] *Transient*, passing.

[6] *Wiles*, endearments.

[7] Upon a still closer view, she appears more thoughtful, more conscious that this life is but a pilgrimage, reasonable, temperate, enduring, provident, capable, discreet, in fine '*a perfect woman*,' that is to say, with all the highest attributes of womanhood ripened to perfection, and *yet a spirit still*.

TO OCEAN.

BY LORD BYRON.

ROLL on, thou deep and dark blue ocean—roll!
Ten thousand fleets sweep over thee in vain;
Man marks the earth with ruin—his control
Stops with the shore; upon the watery plain
The wrecks are all thy deed, nor doth remain
A shadow of man's ravage, save his own,[1]
When, for a moment, like a drop of rain,
He sinks into thy depths with bubbling groan,
Without a grave, unknelled,[2] uncoffined, and unknown.

His steps are not upon thy paths,—thy fields
Are not a spoil for him,—thou dost arise
And shake him from thee; the vile strength he wields
For earth's destruction thou dost all despise,
Spurning him from thy bosom to the skies,
And send'st him, shivering in thy playful spray
And howling, to his gods,[3] where haply lies
His petty hope in some near port or bay,
And dashest him again to earth:—there let him lay.

The armaments which thunder-strike[4] the walls
Of rock-built cities, bidding nations quake,
And monarchs tremble in their capitals,—
The oak leviathans,[5] whose huge ribs make
Their clay creator[6] the vain title take
Of lord of thee,[7] and arbiter of war,[8]—
These are thy toys, and, as the snowy flake,
They melt into thy yeast of waves,[9] which mar
Alike the Armada's pride,[10] or spoils of Trafalgar.[11]

Thy shores are empires, changed in all save thee—
Assyria, Greece, Rome, Carthage,[12] what are they?
Thy waters wasted them, while they were free,
And many a tyrant since; their shores obey
The stranger, slave, or savage; their decay
Has dried up realms to deserts:—not so thou;—
Unchangeable save to thy wild waves' play,
Time writes no wrinkle on thine azure brow—
Such as creation's dawn beheld, thou rollest now.

Thou glorious mirror! where the Almighty's form
Glasses itself in tempests; in all times—
Calm or convulsed, in breeze, or gale, or storm,
Icing the pole, or in the torrid clime
Dark-heaving,—boundless, endless, and sublime,
The image of Eternity—the throne
Of the Invisible; even from out thy slime
The monsters of the deep are made; each zone
Obeys thee; thou goest forth, dread, fathomless, alone.

And I have loved thee, Ocean, and my joy
Of youthful sports was on thy breast to be
Borne, like thy bubbles onward: from a boy
I wantoned with thy breakers[13]—they to me
Were a delight; and if the freshening sea
Made them a terror—'twas a pleasing fear,
For I was as it were a child of thee,
And trusted to thy billows far and near,
And laid my hand upon thy mane, as I do here.

Note that every stanza in this fine passage is a separate sentence. Observe, too, the metre—eight-rhymed decasyllabics (ten-syllabled lines) followed by an Alexandrine or twelve-syllabled line—lines 1 and 3, 2, 4, 5, and 7, and 6, 8, and 9 rhyming with each other. This measure is best known as the Spenserian stanza, from the great and noble use made of it by the poet, Edmund Spenser.

FOR RECITATION.

The first stanza should be said deliberately, care being taken to mark the connection between its subsidiary clauses and sentences, without spoiling the continuous effect of its general structure. A disdainful tone should be conveyed at its close, which in the second stanza should rise to utter scorn.

In the third stanza the spirit is one of lofty irony, saddening somewhat as its last lines are reached.

In stanza four the loftiness of thought remains, but the irony has given way to what is almost pity for the decrepitude of the realms of man as contrasted with the immortal youth of the Ocean.

Then follows the mighty apostrophe to Ocean as the mirror of the Almighty, the image of Eternity, the throne of the Invisible, which can only be fitly given by absolute regard to simplicity, gravity, and dignity of utterance. The utmost height of this great ode has been reached—the fullest sweep of its majestic tide; the last verse sinks from the divine to the human, from sublimity to sympathy; and this very refluence is a relief to the mind, that cannot but have been awe-stricken at the sudden accumulation of such stupendous images.

It is easy, therefore, to pass into a more quiet mood, and even to close with an expression of familiar affection.

[1] *Save his own*, his own ravage or destruction.
[2] *Unknelled*, without a bell to toll for him.
[3] *And howling to his gods, etc.* This may be paraphrased: Thou sendest him crying aloud to Heaven, to the harbour in which his sorry hope of refuge lies, and tossest up his corpse upon the shore. *Lay*, here incorrectly used for lie.
[4] *The armaments which thunder-strike* (poetical for 'fire their cannon upon').
[5] *The oak leviathans*, gigantic vessels of oak.
[6] *Their clay creator*, man.
[7] *Lord of thee*, lord of the sea.
[8] *Arbiter of war*, one who can decide war's issues.
[9] *Thy yeast of waves*, the ferment of thy waves.
[10] *Which mar alike the Armada's pride.* The bulk of the Spanish Armada, after meeting defeat at the hands of the English, suffered shipwreck on the Scotch and Irish coasts.
[11] *Or spoils of Trafalgar.* After Nelson's last victory a severe storm overwhelmed many of the French vessels captured in the engagement.
[12] *Assyria, Greece, Rome, Carthage.* All great naval empires, whose fleets suffered disastrously from tempests.
[13] *I wantoned with thy breakers*, playfully dived under and rode over them. Lord Byron was a fine swimmer. Amongst other feats, he swam the Hellespont.

One Hundred Lines and more for Third Year Pupil Teachers.

THE FORSAKEN MERMAN.

BY MATTHEW ARNOLD.

ARGUMENT.

[A mortal maiden has married a merman, one of the kings of the sea. She is happy with her husband and children, at least, so it seems; till as she sits with them upon a golden throne in the heart of the ocean combing the bright hair of her youngest child, the far-off sound of the Easter bells upon the shore swing down upon her hearing. She sighs, and beseeches the merman to let her join her kinsfolk in prayer at that holy time, lest she should lose her soul. Her wish is readily granted by her husband, for he believes her true, and that she will quickly return to him and her babes. But they watch in vain for her return and seek her in vain upon the shore, and at last return broken-hearted to their home in the ocean, the forsaken merman telling his story and lamenting his loss in the following beautiful words.]

COME, dear children, let us away,
Down and away below!
Now my brothers call from the bay;
Now the great winds shorewards blow;
Now the salt tides seawards flow;
Now the wild white horses[1] play,
Champ and chafe and toss in the spray.
Children dear, let us away!
This way, this way!

Call her once before you go—
  Call once yet!
In a voice that she will know:
  'Margaret! Margaret!'
Children's voices should be dear
(Call once more) to a mother's ear;
Children's voices wild with pain—
Surely she will come again!
Call her once, and come away;
This way, this way!
'Mother dear, we cannot stay!'
The wild horses foam and fret,
Margaret! Margaret!
Come, dear children, come away down;
  Call no more!
One last look at the white-walled town
And the little grey church on the windy shore,
  Then come down!
She will not come though you call all day.
Come away, come away!

Children dear, was it yesterday
We heard the sweet bells over the bay,
In the caverns where we lay,
Through the surf and through the swell,
The far-off sound of a silver bell—
Sand-strewn caverns, cool and deep,
Where the winds are all asleep;
Where the spent lights[2] quiver and gleam;
Where the salt-weed[3] sways in the stream;
Where the sea-beasts ranged all round
Feed in the ooze[4] of their pasture-ground;

Where the sea-snakes coil and twine,
Dry their mail[5] and bask in the brine;
Where great whales come sailing by,
Sail and sail with unshut eye,
Round the world for ever and aye;
When did music[6] come this way?
Children dear, was it yesterday?

Children dear, was it yesterday
(Call yet once) that she went away?
Once she sat with you and me,
On a red gold throne in the heart of the sea,
And the youngest sate on her knee.
She combed its bright hair and tended it well
When down swung the sound of the far-off bell.
She sighed, she looked up through the clear
  green sea.
She said, 'I must go, for my kinsfolk pray
In the little grey church on the shore to-day.
'Twill be Easter-time in the world, ah me!
And I lose my poor soul,[7] merman, here with
  thee.'
I said, 'Go up, dear heart, through the waves;
Say thy prayer and come back to the kind sea-
  caves.'
She smiled, she went up through the surf in the
  bay.
Children dear, was it yesterday?
Children dear, were we long alone?
'The sea grows stormy,' the little ones moan.
'Long prayers,' I said, 'in the world they say.
Come!' I said, and we rose through the surf[8] in
  the bay.
We went up the beach by the sandy down,
Where the sea stocks bloom, to the white-walled
  town,
Through the narrow, paved streets, where all was
  still,
To the little grey church on the windy hill.
From the church came a murmur of folk at their
  prayers,
But we stood without in the cold blowing airs.
We climbed on the graves, on the stones worn
  with rains,
And we gazed up the aisle through the small
  leaded panes.[9]

She sate by the pillar; we saw her clear:
'Margaret, hist! come quick, we are here.
Dear heart,' I said, 'we are long alone.
The sea grows stormy, the little ones moan.'
But oh, she never gave me a look,
For her eyes were sealed to the holy book!
'Loud prays the priest; shut stands the door.

[1] *The wild white horses*, the billows foaming on shore.
[2] *The spent lights*, the light of the sun which had spent its force passing through the deep sea.
[3] *The salt weed*, the sea weed.
[4] *The ooze*, the rich mud.
[5] *Their mail*, their skins bright as polished mail or armour.
[6] *When did music*, etc., *i.e.*, the sound of the Easter bell.
[7] *'And I lose my poor soul.'* A superstition prevailed that mermen and mermaids existed for ages, but that they were without souls, and could not therefore win salvation. Margaret feared that by neglecting her religion she would share this fate.
[8] *The surf*, the foam produced by waves breaking over rough ground.
[9] *The small leaded panes*, small, square or diamond-shaped panes, separated from each other by leaden bars.

Come away, children; call no more!
Come away, come down; call no more!'

Down, down, down!
Down to the depths of the sea!
She sits at her wheel[10] in the humming town,
Singing most joyfully.
Hark what she sings: 'O joy, O joy,
For the humming street, and the child with its toy,
For the priest, and the bell, and the holy well[11]—
For the wheel where I spun,
And the blessed light of the sun.'
And so she sings her fill,
Singing most joyfully,
Till the shuttle[12] falls from her hand,
And the whizzing wheel stands still.
She steals to the window and looks at the sand;
And over the sand at the sea;
And her eyes are set in a stare;
And anon there breaks a sigh,
And anon there drops a tear,
From a sorrow-clouded eye
And a heart sorrow-laden,
A long, long sigh;
For the cold strange eyes of a little mermaiden,
And the gleam of her golden hair.

Come away, away, children;
Come, children, come down!
The hoarse wind blows colder;
Lights shine in the town.
She will start from her slumber
When gusts shake the door.
She will hear the waves howling,
Will hear the waves roar.
We shall see, while above us
The waves roar and whirl,
A ceiling of amber,[13]
A pavement of pearl,
Singing, 'Here came a mortal,
But faithless was she,
And alone dwell for ever
The kings of the sea.'

But, children, at midnight
When soft the winds blow,
When clear falls the moonlight,
When spring-tides[14] are low:
When sweet airs[15] come seaward
From heaths starred with broom,
And high rocks throw mildly
On the blanched[16] sands a gloom;
Up the still glistening[17] reaches,
Up the creeks[18] we will hie,[19]
Over banks of bright sea-weed
The ebb-tide[20] leaves dry.
We will gaze from the sand-hills
At the white, sleeping town;
At the church on the hill-side—
And then come back down;
Singing, 'There dwells a loved one,
But cruel is she!
She left lonely for ever
The kings of the sea.'

[10] *Her wheel*, her spinning-wheel.
[11] *The holy well.* Wells blessed by saints, or held to be consecrated by other causes, are still held sacred by Roman Catholics, and believed to work miraculous cures upon the sick and diseased.
[12] *The shuttle*, an instrument used in weaving.
[13] *Amber.* A yellow glutinous material cast up by the sea, with electrical properties, and hence called electrum by the ancients, which hardens into a beautiful transparent substance highly prized for carving purposes.
[14] *Spring-tides*, the highest rising and furthest falling tides, caused by the united attraction of the sun and moon.
[15] *When sweet airs*, etc., when breezes sweet with the mingled scent of the heather and the broom—whose blossoms shine like golden stars upon the heath—come seawards.
[16] *Blanched*, whitened.
[17] *Glistening*, with a liquid gleam upon them.
[18] *Creeks*, narrow inlets.
[19] *Hie*, hasten.
[20] *The ebb-tide*, the ebbing or retreating tide.

NOTE UPON THE RECITATION OF THE PIECE.

This subject is so exquisitely simple that it calls for but few hints as regards the recitation of it. The voice should be sadly raised just a little when the lost wife and mother is called in the first and second verses. The third verse should be repeated in a dreamy, musing tone, with a note of uncertainty in it, which gives way to deep pathos when the happy sea-group is invaded by the sound of the Easter bells, and the merman trustfully allows his Margaret to return to earth awhile. Growing impatience, subdued, however, by the stillness and solemnity on shore, and dying into despair as the merman fails to win his wife back to him from 'the holy book,' characterizes the next verse. In the succeeding verse the variation of Margaret's mood might be indicated with the more effect by dropping the voice somewhat, and dwelling a good deal on the last two lines. The next verse should be taken very slowly and sadly. The last stanza but one should be given more rapidly, as its movement depicts stormy and passionate feelings; but the final verse should be rendered slowly, softly, and tenderly, for though lost for ever, the cruel one is still for ever beloved.

For Pupil Teachers at end of Fourth Year, 53 lines of Shakspere and 52 of Milton.

'PORTIA'S APPEAL TO SHYLOCK.'

From the Trial Scene in 'The Merchant of Venice,' by William Shakspere.

[Portia disguised as a lawyer, pleads for the life of Antonio, her lover Bassanio's friend, before the Duke of Venice.]

THE quality of mercy is not strained;[1]
It droppeth, as the gentle dew from heaven
Upon the place beneath: it is twice blessed;
It blesseth him that gives, and him that takes;
'Tis mightiest in the mightiest; it becomes[2]
The thronèd monarch better than his crown.
His sceptre shows the force of temporal power,
The attribute to[3] awe and majesty,
Wherein doth sit the dread and fear of kings,
But mercy is above this sceptred sway,
It is enthronèd in the hearts of kings,
It is an attribute to God Himself;

[1] *The quality of mercy is not strained, i.e.*, it is not doled out drop by drop; but overflows in full measure.
[2] *It becomes*, suits temporal power, as opposed to Divine power. Temporal means *for a time*, as opposed to *Eternal*.
[3] *The attribute to*, what is attributed to or belongs to. We should say 'an attribute of.'

And earthly power doth then show likest God's,
When mercy seasons[4] justice. Therefore, Jew,
Though justice be thy plea, consider this—
That in the course of justice[5] none of us
Should see salvation: we do pray for mercy;
And that same prayer doth teach us all to render[6]
The deeds of mercy.

NOTE.

A tenderness of tone exalted to awe, and again descending to a human note, is the key to a right recitation of this inimitable passage.

[4] *Seasons*, tempers.
[5] *In the course of justice*, should we be judged strictly according to our deserts.
[6] *To render*, *i.e.*, to extend to others.

A SONNET.

BY WILLIAM SHAKSPERE.

'There are two cardinal laws of the sonnet, which demand that it shall consist of fourteen rhymed decasyllabic lines, and be a development of one idea, mood, feeling, or sentiment—and one only.'—DAVID MAIN.

LET me not to the marriage[1] of true minds
Admit impediments. Love is not love
Which alters,[2] when it alteration finds,
Or bends with the remover to remove.
O no! it is an ever-fixèd mark,[3]
That looks on tempests and is never shaken;
It is the star[4] to every wandering bark,
Whose worth's unknown, although his height be taken.
Love's not Time's fool,[5] though rosy lips and cheeks
Within his bending sickle's[6] compass come;
Love alters not with his brief hours[7] and weeks,
But bears it out[8] even to the edge of doom.
If this be error, and upon me proved,
I never writ,[9] nor[10] no man ever loved.

NOTE.

The first eight lines should be given with an expression of ardent conviction, 'whose worth's unknown,' being its culminating note. The next four lines should be repeated with a quiet, earnest subsidence of tone. Then after a pause the closing couplet should be spoken with strong emphasis, just touched with irony.

[1] *The marriage*, the continual union.
[2] *Which alters,.....or bends*, which when the object of affection alters or is removed, alters or is removed also.
[3] *An ever-fixèd mark*, a landmark for storm-driven vessels to steer by.
[4] *The star*, the Pole Star, whose value is priceless, though its altitude is gauged.
[5] *Time's fool*, *i.e.*, the mere sport of Time.
[6] *His bending sickle*. Time is pictured with a scythe owing to his destructive power over all human things.
[7] *His brief hours*, Time's.
[8] *Bears it out*, endures, *to the edge of doom*, till the day of doom or judgment is reached.
[9] *Writ*, old English for 'wrote.'
[10] *Nor no man*, we should say 'and no man.' The double negative, which is now vulgar, was once correct and used to imply a strong emphasis.

THE CHARACTER OF CARDINAL WOLSEY.

From Shakspere's 'Henry VIII.' Act V., Scene 2.

Griffith.— This Cardinal,
Though from an humble stock,[1] undoubtedly
Was fashioned to[2] much honour from his cradle.
He was a scholar, and a ripe and good one;
Exceeding wise, fair spoken,[3] and persuading;[4]
Lofty and sour, to them that loved him not;
But, to those men that sought him, sweet as summer,
And though he were unsatisfied in getting,[5]
(Which was a sin,) yet, in bestowing, madam,[6]
He was most princely; ever witness[7] for him
Those twins of learning, that he raised in you,
Ipswich and Oxford! one of which fell with him,
Unwilling to outlive the good that did it;[8]
The other, though unfinished, yet so famous,
So excellent in art, and still so rising,[9]
That Christendom shall ever speak his virtue.
His overthrow heaped happiness upon him;
For then, and not till then, he felt himself,
And found the blessedness of being little;
And, to add greater honour to his age
Than man could give him, he died fearing God.

NOTE.

The recitation of this passage calls for little suggestion. Griffith is addressing Queen Catherine, and so there should be an air of respect in the deliverance of this eulogy of her enemy, but beyond this a tone of unaffected admiration and regret for the death of a great man is all that is called for, coupled in the last five lines with an indication of complete submissiveness on Wolsey's part to the will of God.

[1] *From an humble stock*, said to have been a butcher's son at Ipswich.
[2] *Was fashioned to*, educated to, his character formed for.
[3] *Fair spoken*, with a good address.
[4] *Persuading*, persuasive.
[5] *Unsatisfied with getting*, ambitious, a fault which he himself deplores in his famous farewell to Thomas Cromwell.
[6] *Madam*, Griffith is addressing Queen Catherine of Arragon.
[7] *Ever witness*. Ye twin seats of learning, Ipswich and Oxford, always bear witness in his favour.
'His school at Ipswich was eclipsed by the glories of his foundation at Oxford, whose name of Cardinal College has been lost in its later title of Christ Church.' J. R. Green's 'Short History of the English People,' page 317.
[8] *The good that did it*, the good man who created it.
[9] *So excellent in art and still so rising*, so beautiful in its architecture as far as it has been built, and giving such promise of further beauty.

TO THE NIGHTINGALE.

A SONNET BY JOHN MILTON.

O NIGHTINGALE, that on yon bloomy spray
Warblest at eve, when all the woods are still,
Thou with fresh hope the lover's heart dost fill,
While the jolly hours[1] lead on propitious May.[2]
Thy liquid notes that close the eye of day,[3]

[1] *The jolly hours*, the beautiful hours. Jolly had this, the French sense of the word, originally.
[2] *Propitious May*. May that promises well.
[3] *That close the eye of day*, that are heard first at sundown.

First heard[4] before the shallow cuckoo's bill,
Portend success in love; oh, if Jove's will[5]
Had linked that amorous power[6] to thy soft lay,
Now timely sing,[7] ere the rude bird of hate[8]
Foretell my hopeless doom in some grove nigh;
As thou from year to year hast sung too late
For my relief, yet hadst no reason why:
Whether the Muse,[9] or Love, call thee his mate,
Both them I serve, and of their train am I.

NOTE.

Passionate entreaty, tinged with pathos and relieved by playfulness, are the characteristics of the piece to which the attention of the reciter is drawn.

[4] *First heard.* The nightingale's song, if heard before the cuckoo's note, was supposed to *portend*, foretell, success in love.
[5] *Jove's will*, the will of Jupiter, the chief of the gods.
[6] *That amorous power, i.e.*, the power to foretell success in love.
[7] *Timely sing, i.e.*, in good time.
[8] *The rude bird of hate*, the cuckoo, whose voice, if heard before the nightingale's, would portend disappointment in love.
[9] *The Muse*, the Spirit of Poetry. The last two lines imply that as the nightingale is either the companion of Poesy or Love, and he is the servant of both, the bird has it in her power to plead with one or other of these powers on his behalf.

ON HIS BEING ARRIVED AT THE AGE OF TWENTY-THREE.

A SONNET BY JOHN MILTON.

How soon hath Time, the subtle thief of youth,
Stolen on his wing my three-and-twentieth year!
My hasting days fly on with full career,
But my late spring[1] no bud or blossom shew'th;
Perhaps my semblance might deceive the truth,[2]
That I to manhood am arrived so near.
And inward ripeness[3] doth much less appear,
That some more timely happy spirits endu'th.[4]
Yet be it less or more,[5] or soon or slow,
It shall be still in strictest measure even
To that same lot, however mean or high,
Toward which Time leads me, and the will of Heaven;
All is, if I have grace to use it so,
As ever[6] in my great Task-Master's eye.

NOTE.

The first eight lines should be given with a certain degree of despondency; but with the ninth there should arise an expression indicating the resolution of the poet to do his duty in the state of life to which God has called him, whatever it may prove to be.

[1] *My late spring, etc.* The spring, or promise of moral excellence in him.
[2] *My semblance might deceive the truth.* Milton was remarkably youthful-looking at this age; indeed, owing to his smooth skin, fine features, and the long curls, which it was at the time the fashion for men to wear, he looked more like a beautiful woman than a youth.
[3] *Inward ripeness*, ripeness of the soul and reason.
[4] *That some more timely-happy spirits endu'th*, which endues some spirits more early favoured (with such heavenly fruit) than myself.
[5] *Yet be it less or more, etc.* This passage may be thus paraphrased:—'Yet though my final fruition be little or large, early or late, it shall be in strict consonance with that lot, however mean or high, towards which time and God's will are leading me.' He will be true to himself, whatever Providence has in store for him.
[6] *All is . . . as ever.* 'Everything I do shall be done as it ever has been, in the sight of Heaven, if I but have the grace given me thus to use my powers.'

ON HIS BLINDNESS.

A SONNET BY JOHN MILTON.

WHEN I consider how my light is spent
Ere half my days,[1] in this dark world and wide,
And that one talent[2] which is death to hide
Lodged with me useless, though my soul more bent[3]
To serve therewith my Maker and present
My true account, lest He returning chide.
Doth God exact day-labour, light denied?
I fondly ask.[4] But Patience, to prevent
That murmur, soon replies, God doth not need
Either man's work or His own gifts; who best
Bear His mild yoke,[5] they serve Him best: His state
Is kingly; thousands at His bidding speed,
And post[6] o'er land and ocean without rest;
They also serve who only stand[7] and wait.

NOTES.

Milton's blindness was evidently brought on by excessive study at the University, and for many years after, as a scholar and author, and Latin Secretary to the Commonwealth.

Bishop Newton writes of him that 'his eyes were of a light blue colour, and from the first were none of the brightest, but after he lost his sight of them they still appeared without spot or blemish, and at first view and at a little distance, it was not easy to know that he was blind.'

This poem should be started with an accent of some impatience, great care being taken to give just emphasis to the subordinate clauses and sentences till the seventh line is reached, when the voice should be 'lifted' upon the enquiry there contained. The second half of the sonnet, or the answer of Patience, should be calmly rendered, the co-ordinate sentences given with quiet firmness, the delivery quickening in lines 12 and 13 to suit the action, when there should be a pause to give more effect to the perfect submissiveness of attitude expressed in the last line.

[1] *Ere half my days.* Milton was about forty-three at the time. He lived twenty-two years longer.
[2] *That one talent.* That of an author. An allusion is made to the Parable in Matthew xxv.
[3] *Though my soul more bent....* Though my soul being more bent.
[4] *I fondly ask.* Notice the inverted construction. The passage means 'I fondly ask, Doth God exact day-labour from one to whom light is denied (through blindness)?'
[5] *His mild yoke.* 'My yoke is easy.'
[6] *Post* = hasten.
[7] '*They also serve who only stand and wait.*' This beautiful line has become proverbial.

SONG ON MAY MORNING.

BY JOHN MILTON.

NOW the bright morning star, day's harbinger,[1]
Comes dancing[2] from the east, and leads with her
The flowery May, who from her green lap throws
The yellow cowslip and the pale primrose.
Hail, bounteous May, that dost inspire
Mirth and youth and warm desire;[3]

[1] *Harbinger*, foreteller, herald.
[2] *Dancing*, its rays sparkling so that it appears to dance—a beautiful image.
[3] *Warm desire*, warm affection.

Woods and groves are of thy dressing,
Hill and dale doth boast thy blessing.
Thus we salute thee with our early song,
And welcome thee, and wish thee long.[4]

NOTE.

This song should be given in a happy tone, the first four lines being taken somewhat more rapidly than the four succeeding ones, and a slight pause being allowed at the end of the eighth line.

[4] *Wish thee long.* Wish a long continuance of May time.

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Lessons in English.

BY ALEXANDER BAIN, LL.D.

VI.—EMOTIONAL QUALITIES.

I HAVE already brought to view the quality of Impressiveness, as having both an intellectual and an emotional bearing. The less ambiguously Emotional qualities must now be exemplified.

A preparatory scheme of these Qualities is essential as a basis: which scheme must be expressed in terms of our emotional nature. Various modes of laying out the subject might be suggested; and, as there is no space for discussing the merits of the respective proposals, we must be content with such an outline as shall supply an adequate terminology for the analysis that is to follow.

The full compass of Poetical criticism ranges over Figures of Speech, Emotional Qualities, and Poetic Arts; the three not being entirely separable; but all being necessary for our purpose. The Figures I do not propose to classify; the more important of them are familiar to pupils of the Higher Composition. The Emotional Qualities (more or less implicated in the Figures) are not so easy to specify and define.

Sublimity, Beauty, Wit and Humour, Melody, Harmony, Picturesqueness,—are received designations for emotional qualities. A slight modification of these, accompanied with suitable explanations or definitions, is what we will now attempt.

The Human Feelings are either Sensations or Emotions. Our sensations are a great source of our pleasures, but only a part of these can be introduced into Art. The pleasures of sight and hearing are the most elevated: and the ideas of these enter largely into poetry, as pictures to the imagination, and language to the ear. In their most simple, or uncombined forms, these are the sensuous effects of poetry.

Next are the Emotions: of which two classes are fundamental, and very nearly exhaust our emotional nature; the one class, the Irascible or malevolent group; the other the Amicable, loving, or benevolent. The influence of these comes out in direct and unmistakable forms; and also in many subtle transformations, not always easy to trace. By virtue of a class of objects that face both ways at once, there is a kind of transition from the one to the other, notwithstanding their widely opposite nature.

The malignant passion may be expressed as the human survival of the passion for prey in the lower animals. It gives a positive delight in the sufferings of other beings, although there are usually certain disguises or pretexts whereby we justify to ourselves the infliction of suffering. Revenge is the most usual manifestation of this form of delight.

The counter passion of Love and Benevolence is also a grand source of pleasure, and is largely involved in all the productions of Art. Through it we take delight in representations of love and goodness; these show Art in its most humanising form.

The Emotion termed Sublimity is connected with vastness of Power; which sometimes takes the form of maleficent power, and sometimes of beneficent; while at other times, it is simply a possibility of one or the other. In parsing for the quality of Sublimity in style, we should make the distinction as far as we are able.

The effect called Pathos belongs exclusively to the Tender, Amicable, or Loving Emotion. Its most representative aspect comes out when we make use of the Emotion as a means of soothing and consoling the mind under pain. The Beautiful, in a somewhat narrow sense, and in contrast to the Sublime, is concerned with the manifestations of Tender Feeling. In a wider sense, Beauty, or the Beautiful, is co-extensive with Fine Art as a whole.

A scale of the effects growing out of the two grand master passions, may be drawn thus:—

1. Malignant Revenge.
2. Righteous Indignation.
3. Maleficent Power, or the Sublime of Destruction.
4. Power, as vast possibility simply.
5. Beneficent Power, marked by conquest of enemies.
6. Power of Constructive Beneficence; doing good on a grand scale without destructive or maleficent accompaniments.
7. Love, as Active.
8. Affection, simply as such.
9. Sorrow and Pathos.

In a systematic course of Rhetoric, these would be all exemplified *seriatim;* and to pupils of advanced classes, they would readily become intelligible. They present a gradation from Sublimity to Pathos, and show intermediate stages partaking of both qualities; it being a possibility of the mind to entertain at once the two opposite modes of feeling, by merely presenting them in different connections. Each of the two classes has its pleasures, and a mixed

glow is producible through their being skilfully combined, or, at all events, rapidly alternated.

Humour and the Comic are supposed to be based on our malevolent feelings, qualified and transformed by subtle arts, and by an admixture of the amicable passion. We shall not attempt, in the present short series of lessons, to deal (beyond a slight occasional allusion) with this peculiar class of effects; we have enough to occupy us in endeavouring to analyse the serious qualities.

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> Triumphal arch that fill'st the sky,
> When storms prepare to part!
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The two first lines contain an image of great sublimity, referring to one of the grandest objects of nature. The poetic art lies in providing a verbal expression that recalls the original, and heightens the effect by an apt comparison, and a well-chosen adjunct. The metaphor—"triumphal arch"—heightens the sublimity by the feelings associated with victory, the foundation of which is our maleficent emotions; augmented by various other well-known circumstances of delight. There is thus introduced an effective touch of genuine sublimity. The associated circumstance—"When storms prepare to part"—is a continuation of the same effect. The feeling associated with storms is the sentiment of power as destructive energy. The poet selects these two heightening expressions as his first effort at a poetic rendering of his subject. He does not adhere to this view in the remainder of the poem, as we shall see.

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The phrase, "my childhood's sight," transports us back to the simplicity and fondness of our early years, yields a poetical effect of the nature of pathetic or tender feeling. This is carried out in the idea of the two last lines—"for happy spirits to pass between earth and heaven." A picture of celestial bliss necessarily engages our soft affections and pleasing emotions. The danger now is to keep clear of the maudlin, which we readily run into, when affection is iterated in hacknied phraseology. The poet is more successful in some of the other stanzas, where his originality has a redeeming power.

> Can all that optics teach unfold
> Thy form to please me so,
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Here there is a carrying out of the notion started in the first stanzas, namely, the inferiority of science to poetry or feeling in the handling of nature. The introduction of the contrast is perhaps the only questionable thing in the ode. There is no need to disparage science in order to elevate poetry; each stands on its own independent merits, and a poet should rather avoid

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Hid in thy radiant bow.

The continuation of the fancy of childhood is well sustained by the choice of the glittering objects —gems and gold—and by the kindred metaphor "radiant," which brings to view an attribute of the sun—the sublimest object of the physical world.

The fourth stanza carries on the strife between poetry and science; the force and elevation of the language going far to atone for the unseemliness of the quarrel.

When science from Creation's face
Enchantment's veil withdraws,
What lovely visions yield their place
To cold material laws.

"Creation's face" belongs to the language of the sublime, from the comprehensiveness of the word, and the personification implied in it. "Enchantment's veil" expresses a high intensity of human pleasure, and is, from that cause, pleasing, if not vulgarised by a commonplace setting. "Lovely visions" also expresses delight, and is eminently poetic, being the poetry of our affectionate nature. The final touch—"cold material laws" gives us a kind of shudder, and is of itself a disagreeable suggestion, but for the use made of it, namely, to excite a burst of indignation against science. The objection to the whole is that we cannot work ourselves up into a sense of the injury done us by science, sufficient to justify a copious and luxurious outburst of indignant passion. In the conjunction, "cold material," there is a harmonious fitting of the two words, arising from the kindred emotional meanings: and harmony is always poetic.

The fifth stanza takes a higher flight—

And yet, fair bow, no fabling dreams,
But words of the Most High,
Have told why first thy robe of beams
Was woven in the sky.

Several of the arts of elevated style can here be exemplified. The bold Apostrophe is the setting of the whole. The strain is not markedly sublime, and not markedly pathetic or tender; it is the energetic assertion of a truth, enhanced by the power of contrast, and rendered touching by the emotional force of the several epithets employed. The opinion so strongly maintained is not very fortunate, seeing that it refers to one of the oldest difficulties in the Mosaic narrative, which has never been satisfactorily cleared up. Poets have no right to dogmatise where competent authorities express doubt; but, waving this objection, the stanza is a masterpiece of language; and every point admits of being rendered illustrative. The energetic contrast, "no fabling dreams" heightens the force of the assertion; and it is a case where contrast is not superfluous. The fine figure in the two last lines can be studied as an elegant and elevating similitude. The phrase "words of the Most High" as a figure for the Bible record, is in itself grand, and is brought in so as to avoid the tameness of familiarity.

When o'er the green undeluged earth
Heaven's cov'nant then didst shine,
How came the world's gray fathers forth
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The poet here turns our thoughts to the significance of the bow, as an assurance against the re-flooding of the earth; and sets forth a poetic circumstance yielding the pathos of devout feeling. The most venerable representatives of the race, after the flood, "the world's gray fathers," are summoned to do homage to the sign. "The green undeluged earth" is a poetic condensation, which may be expanded in prose—"When thou didst shine, as Heaven's covenant, o'er the green earth, never again to come under a deluge—to be flooded." The epithet "sacred" chimes in with the general effect.

And when its yellow lustre smiled
O'er mountains yet untrod,
Each mother held aloft her child
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A new picture is here given made up of epithets and circumstances, intended to enhance the glory of the object, and to make still farther use of the pathos of devoutness and gratitude. The combination "yellow lustre smiled" is somewhat forced, but yet within the licence of poetry. The action of smiling would, no doubt, be better suited by something more personal than yellow lustre; but the emotional meanings of the words are not in any way discordant. The circumstance—"O'er mountains yet untrod"—may be supposed to refer to the time immediately succeeding the flood, when the repeopling of the earth had proceeded a very little way—an inference that does not at once disclose itself. The more obvious suggestion of mountain solitudes would not conspire to the intended effect. The figure of the two last lines has undoubtedly the beauty of pathos, but does not add much to the effect of the "gray fathers" in the previous stanza. A bolder and more successful flight awaits us in the next stanza.

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It is a little absurd to suppose that, for fifty years, the thoughts of men had only one stirring topic, namely, the avoidance of another deluge; that there was nothing besides to furnish inspiration to poetry: still, the choice of circumstances contributes to heighten the grandeur of the subject, provided only we do not begin to feel that it is overdone. The poet himself does not feel so, for he grows warmer with his theme, and rises to a still higher flight in the stanza that follows.

Nor ever shall the muse's eye
Unraptured greet thy beam:
Theme of primeval prophecy,
Be still the poet's theme!

The loftiness of this sentence arises from the strain of exultation of the poet, drawing upon the dignity and greatness of his art, and expressing it by choice and compact language. We hear of the "Muse" in the poetry of all ages: but it never loses its associations of dignity and charm. The personification in the two first lines is vivid and terse. The effect approaches the sublime, rather than the tender mood. The two last lines derive their force from the magniloquent reference ("primeval prophecy") to the old subject, the prediction to Noah, and from the bold apostrophe—"be still the poet's theme."

We have next two exquisite stanzas, cast out of the permanent adjuncts of the bow, and independent of the connection with the deluge.

The earth to thee her incense yields,
The lark thy welcome sings,
When, glitt'ring in the freshened fields,
The snowy mushroom springs.

The beauty here ranges with tender feeling. The selection of circumstances fitted to enter into harmonious combination is everything that a poet could wish. The first line is a poetic rendering of the vapour that is the first source of the rain; it is poetized by the metaphor "incense," redolent of perfume and associations of sacredness. The introduction of the lark is the addition of one of our permanent charms; having, if not a special adaptation to the occasion, at least a general coincidence of effect, when the rainbow is viewed on the side of beauty, rather than of sublimity. The two last lines gather in a new circumstance from the rain—the bursting out of the mushroom growths in the fields. If this incident were viewed in its naked aspect, it would fail to lend the expected agreeable additions to the grouping; but as expressed in the poet's phraseology ("glittering and snowy"), and dignified with his impressive metre, it answers his intentions in composing a group of heightening accompaniments to the main theme.

How glorious is thy girdle cast
O'er mountain, tower, and town,
Or mirrored in the ocean vast,
A thousand fathoms down!

A truly magnificent stanza: the sublimest in the piece. The figure—Exclamation, is the setting of the whole: (the verb "is" in the first line might be omitted in conformity with the usage of the figure). The sublime aspect of the rainbow, from its celestial dimensions and span, is here done justice to once more; improving upon the two first lines of the opening stanza. The vastness of the embrace is pictured forth by the choice of the most conspicuous and grand of the objects of the earth—"mountain, tower, and town;" a grouping which, if not a climax, neither is it an anticlimax: a town, in one view, has not the sublimity of the mountain, but it has a counterbalancing importance from its aggregate of objects and interests. But for the highly effective emphasis of the word as closing the line, "city" would be preferable from its greater dignity of associations: as in Milton's description from the mountain of temptation—"cities many and high-tower'd."

The two last lines bring in the ocean with greater effect, although with some licence of imagination. The wide ocean is one of our most sublime terrestrial objects; and its character in that respect is helped out by the powerful epithet "vast"; while the line has the poet's usual energy of metre. The "mirroring" is an expansion of the image of the bow, but unfortunately not true to fact in the ordinary state of the ocean's surface; the "thousand fathoms down" is a splendid expression for what might happen in a very rare moment.

The poet returns once more to the historical aspect of the bow; and embodies it with the poetic touches of the two concluding stanzas.

As fresh in yon horizon dark,
As young thy beauties seem,
As when the eagle from the ark
First sported in the beam.

This is legitimate poetic thought. The phenomena of the world that are naturally imperishable or undecaying can be placed in effective contrast with the numerous examples of decay that we are destined to experience. The negative of such a painful circumstance as perishability and mortality constitutes a high and impressive merit, and enters into our permanent phraseology of laudation. "The eagle from the ark" plays an expressive part, as did the previous introduction of the lark, contributing to the sublime aspect of the subject, which the poet handles alternately with the other.

For, faithful to its sacred page,
Heaven still rebuilds thy span,
Nor lets the type grow pale with age
That first spoke peace to man.

"Heaven" is here impressively endowed with its double function, namely, as the source of Bible inspiration, and as the prime mover of the natural world. The benign aspect of sublimity is well exemplified in the union of the different strains; while there is an iteration of the negative of decay, coupled with the benign reference to the goodness of Heaven as its cause.

Eminent Practical Teachers.

DAVID STOW,

Founder of the Training System of Education.

BY JOHN R. LANGLER, B.A., F.R.G.S.,

Of the Westminster Training College, Ex-President of the National Union of Elementary Teachers.

VI.

THE Sympathy of Numbers was recognised by Mr. Stow as a chief instrument in the intellectual advancement, and especially in the moral regeneration, of the people. 'Example, indeed, is more powerful than precept, but *sympathy* is more powerful than either, or both combined.' Forty years ago children had not even the negative advantage of compulsory attendance at school. They were not, during any portion of the day, deprived of the evil training of the streets, and their habits were being formed under the mighty influence of a *sympathy* which was then 'all on the side of evil.' To lay hold on this principle and turn it to good was, as we have seen, the object Mr. Stow had constantly in view, and the classification of children in distinct departments, the 'raised gallery,' the simultaneous method of instruction, and, particularly, the 'uncovered schoolroom,' were all devised by his untiring ingenuity to secure this desirable result. The Sympathy of Numbers is, of course, chiefly felt in large centres of population, and it was to our large towns that the Moral Training System was designed to be primarily and specially applicable. Children naturally associate for any pursuit, innocent or mischievous, with others of about the same age, rather than with those who are much older or much younger. Right precept—*mere* precept—is powerless in the presence of such association, when precept, example, and sympathy are united on the side of wrong. The 'trainer' who by his conduct secures the confidence and sympathy of his children can use this influence always in favour of what is right, and experience has confirmed the theory which Mr. Stow endeavoured to establish:—'The play-ground and the gallery conjoined, under proper management and superintendence, afford the most perfect sympathy.' This principle of our nature was utilised in the Glasgow System, not only in connection with moral training, but also, as before stated, in the intellectual processes. 'Teaching is not training' is the first fundamental principle of Stow's System, and the Sympathy of Numbers is the second. The oral training lessons, whilst they secure to infants and others unable to read a vast amount of intellectual instruction, at the same time tend to establish the sympathy which is held to be vital to the Moral Training System,

No one, however unacquainted he may have previously been with the principles now explained, will be surprised to find that Mr. Stow set the highest value on Infant Schools. 'You will acknowledge that the Infant or Initiatory School is not the lowest, but the highest in the scale. A man who makes a good infant trainer never fails in making a first-rate juvenile trainer. A rough gardener may raise coarse plants, but only an experienced one can be be trusted with exotics' (Hint 139). This point has been named in connection with the power of simplifying any subject of instruction. It must not, however, be understood from this quotation that men are to be preferred to women as trainers in Infant Schools. A 'Criticism Lesson in the Initiatory Department' was to all students the most dreaded, because the most difficult, test of true teaching power. Not a few graduates have quailed before the infants, who, in spite of all their efforts to make a point plain, 'wouldn't understand.' The mere scholar, unpractised in the art of teaching, could not present simple ideas in simple language, and many an amusing scene will readily recur to the memory of all who have witnessed such struggles. As about one-third of the children in our schools may be considered as infants, the importance of infant teachers to the community demands the attention which Mr. Stow always claimed for it.

In concluding this brief consideration of the character of the Training System, it may be well to remember that, unlike some schemes of education, it was not in its origin the practical application of some preconceived theory. It was developed by degrees during an effort to benefit, both morally and intellectually, the sunken masses. It was the result of the experience of a highly intelligent and strongly sympathetic Christian gentleman. The history of its development has been imperfectly sketched. We have also noticed, as the features of the system named 'distinctive' by Mr. Stow, the use of the Sympathy of Numbers for moral and intellectual purposes, the Bible and other oral training lessons, the 'picturing out in words,' and the systematic use of the 'uncovered schoolroom,' and of a 'raised gallery.' Reference has been made to some details of method which were adopted in daily school work.

It only remains to commend to all who are entering on the study of education, or who intend to become practical teachers, to read Mr. Stow's own work, 'The Training System.' For the student's purpose its arrangement might have been advantageously different, but every young teacher will nevertheless find in it hints of great and permanent value. The principles of the system are of general application, and 'results' such as have attracted the attention of philanthropists will doubtless follow wherever such training is adopted, These 'results,' however, cannot all be tabulated, and the most important of them are likely to be entirely overlooked. It is an unwelcome fact that at present mere mechanical results are often more highly valued than true educational work, which cannot ordinarily be recorded. It will not be so always.

Archimedes, in considering the power of the lever as a machine, is said to have exclaimed:

Δὸς ποῦ στῶ, καὶ τὴν γῆν κινήσω.

('Give me where I may stand (sto), and I will move the world.')

The name of the founder of the Training System recalled this enthusiastic outburst of the mechanician of Syracuse to the mind of the writer on the completion of his short course of training at Glasgow. With a similar enthusiasm fully shared by his fellow-students he entered on his work as a practical teacher, and he still believes that the Moral Training System, resting on the fulcrum of revealed truth, is a lever capable not only of raising the classes for whom it was first designed, but of lifting the whole community to a higher level of moral power and intellectual life.

THE FARMER'S BOY.

T. CRAMPTON.

Cheerfully.
1st TREBLE.
2nd TREBLE.
BASS.
1. Oh, a farm-er's boy is a jo-vial lad, So health-y, bright, and free; In his
2. In the morn-ing bright he drives a-way— Be-fore the sun we see— The
3. When the au-tumn winds are sweep-ing wild, He's gath'ring nuts, you see; For a
KEY D. Cheerfully.
cot-tage home he is ev-er glad, With health and li-ber-ty..... With a
low-ing herd to the sil-ver stream, And pas-tures green and free..... In the
win-ter's store he'll lay them by For friends, him-self, and me..... To the
A. t.
"hie, gee woh!" to his live-ly team, With the lark a-broad is he, With his bread and milk un-
sum-mer time to the har-vest field With a cool-ing drink goes he, And he works a-way right
or-chard then he hies a-way, For he knows each fav-rite tree, And he saves the fruit right
robb'd of cream: Oh, the farm-er's boy for me! Oh, the farm-er's boy for me!.....
mer-ri-ly! Oh, the farm-er's boy for me! Oh, the farm-er's boy for me!.....
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ANSWERS TO ARITHMETICAL QUESTIONS IN 'THE SCHOLAR,' FOR FEBRUARY, 1883.

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C. 1. 1,975,617d.
2. 2,972,970 sq. ft.
3. £3923 2s. 5½d.
D. 1. 1 w. 1 d. 7 h. 7 m. 3 s.
2. £3,999 18s. 7½d.
3. £1 9s. 8½d.
E. 1. £1 3s. 5½d.
2. £53 17s. 9½d.—736.
3. £252 9s. 0½d.
F. 1. 81 lb. 10 oz. 11 dwt. 1 gr.
2. 10s. 3½d.
3. 223 cwt. 2 qr. 20 lb. 8 oz.

ADVANCED EXAMINATION.

1. 400 yds.
2. £15 11s. 3d.
3. 665 coats, 1 yd. 3 qr. 2 nl. left.

STANDARD V.

A. 1. £14 15s. 0½d.
2. £28 7s. 3½d.
3. £291 5s. 2½d.
B. 1. £75 19s.
2. £1354 10s.
3. £5 3s. 6$\frac{8}{11}$d.
C. 1. £7 8s. 5d.
2. £3952 13s. 4d.
3. 20.
D. 1. £56 4s. 11½d.
2. £17 3s. 10½d.
3. £7446 3s. 4½d.
E. 1. £11 10s. 0½d.
2. £22 2s. 0½d.
3. £97,230 19s. 7½d.
F. 1. 17 cwt. 2 qr. 14 lb.
2. £370.
3. £16 12s. 9½d.

ADVANCED EXAMINATION.

1. £73 3s. 7½d.
2. M. 14s.; w. 10s. 6d.
3. £39 18s. 10½d.

STANDARD VI.

A. 1. 2$\frac{11}{12}$.
2. $\frac{1}{20}$.
3. 8$\frac{8}{9}$.
B. 1. ·84375.
2. 434·36.
3. ·03359375.
C. 1. 264 shirts.
2. 3$\frac{1}{2}$.
3. 6s. 4d.
D. 1. £1200.
2. £4 7s. 9d.
3. £2 7s. 5$\frac{1}{2}$d.
E. 1. 213$\frac{1}{2}$ days.
2. 5$\frac{1}{2}$d.
3. $\frac{1}{112}$ cwt.
F. 1. 145 to 228.
2. 2$\frac{1}{2}$$\frac{3}{4}$.
3. £113 2s. 8$\frac{1}{2}$d.

ADVANCED EXAMINATION.

1. 60 hours.
2. 11$\frac{2}{3}$ days.
3. 106$\frac{2}{3}$ yards.

STANDARD VII.

A. 1. £35.
2. £19 19s. 9d.
3. 7s. 5$\frac{7}{10}$d.
B. 1. £99 4s. 6d.
2. 3$\frac{93}{105}$ p. ct.
3. 7s. 4·23d.
C. 1. 13$\frac{7}{11}$.
2. £55 10s.
3. £2 11s. 2$\frac{1}{2}$d.
D. 1. £758 18s. 6$\frac{3}{4}$d.
2. £64 0s. 9$\frac{23}{103}$d.
3. 29$\frac{7}{17}$ p. ct.
E. 1. 999,350.
2. £161 12s. 7$\frac{1}{2}$d.
3. 7$\frac{1}{2}$ per cent.
F. 1. 4$\frac{1}{2}$ per cent.
2. 2$\frac{93}{103}$ years.
3. £2 9s. 11$\frac{43}{44}$d.

ADVANCED EXAMINATION.

1. £51 increase.
2. £54$\frac{2}{3}$ per cent.
3. £3 11s. 4$\frac{1344}{1445}$d.

SOLUTIONS OF THE ADVANCED EXAMINATION QUESTIONS IN 'THE SCHOLAR,' FOR FEBRUARY, 1883.

STANDARD IV.

1. £150 + £25 = £175 selling price of the cloth.
£175 ÷ 8s. 9d. = 400 yards. Ans.

2. £50 − £18 17s. 6d. = £31 2s. 6d., *twice* price of foal
£31 2s. 6d ÷ 2 = £15 11s. 3d. Ans.

3. 48½ yds. × 50 = 2412½ yds. of cloth.
2412½ yds. = 38600 nls., and 3 yds. 2 qrs. 2 nls. = 58 nls.; then 38600 nls. ÷ 58 nls.
= 665 coats, and 1 yd. 3 qrs. 2 nls. left. Ans.

STANDARD V.

1. John Robinson, Esq.,
To. Wm. Carpenter.

				s.	d.	£	s.	d.
18 bricklayers	each	4½	days at	5	6 =	22	5	6
13 joiners	,,	5½	,,	5	2 =	17	12	7½
9 masons	,,	3½	,,	5	9 =	9	1	1½
5 slaters	,,	6½	,,	6	3 =	10	3	1½
10 labourers	,,	7½	,,	3	9 =	14	1	3
						£73	3	7½ Ans.

Paid Feb. 3rd, 1883. Wm. Carpenter. (N.B.—A penny stamp required.)

2. 3s. 6d. × 80 = £14 excess received by men. Then £87 10s. − £14 = £73 10s. to be *equally* divided among the (80 m. + 60 w. =) 140 persons. Hence £73 10s. ÷ 140
= 10s. 6d. a woman's share. Ans.
And 10s. 6d. + 3s. 6d. = 14s., a man's share. Ans.

3. £1 5s. 11½d. ÷ 15 = 1s. 8½d. per qr. = 6s. 11d. a yard.
6s. 11d. × 115½ = £39 18s. 10½d. Ans.

STANDARD VI.

1. $\frac{1}{5} - \frac{1}{15} = \frac{2}{15}$ fraction of the work done by D in *one* hour, hence he would be 60 hours in doing the whole. Ans.

2. As 20 men = 25 women, a woman eats $\frac{4}{5} = \frac{1}{5}$ of what a man does, hence $\frac{1}{5}$ of 30 = 24 the equivalent in men of the 30 women. Then 40 + 24 = 64 men. Then by proportion,

$$\frac{15\text{d.} \times 20\text{m.} \times 500\text{st.}}{64 \times 200} = 11\tfrac{13}{16} \text{ days. Ans.}$$

3. ·85 of 2·2 cr. = 1·87 cr. = £·4675 cost per yd.
£·655 − £·4675 = £·1875 = 3s. 9d. gain per yard, and £20 ÷ 3s. 9d. = 106$\frac{2}{3}$ yards. Ans.

STANDARD VII.

1. 84 (No. of hundreds) × 3 = £252 annual income from the 3 per cents. £101 × 84 = 8484 cash received on selling out. £8484 ÷ £140 = 60$\frac{3}{5}$ cents. of stock bought. £5 × 60$\frac{3}{5}$ = £303 annual income from the 5 per cent. stock. Then £303 − £252
= £51 increase. Ans.

2. At 3s. 6d. the skates that cost £100 sell for £135, and as 4s. is $\frac{8}{7}$ of 3s. 6d., then $\frac{8}{7}$ of £135 = £154$\frac{2}{7}$, the excess of which over £100, that is £54$\frac{2}{7}$, is the gain per cent. Ans.

3. 120 days = $\frac{120}{365} = \frac{24}{73}$ of a year; $\frac{24}{73}$ of £4 = £1$\frac{23}{73}$ interest on £100 for 120 days. Hence £100 would amount to £101$\frac{23}{73}$, consequently the discount is $\frac{1\frac{23}{73}}{101\frac{23}{73}} = \frac{96}{7396} = \frac{24}{1849}$ of the given sum of money; then $\frac{24}{1849}$ of £275 = £3 11s. 4$\frac{1344}{1445}$d. Ans.

ANSWERS TO ARITHMETICAL QUESTIONS IN 'THE LITTLE LEARNER,' FOR FEBRUARY, 1883.

STANDARD I.

A. (1) 288
(2) 132
(3) 198
B. (1) 1,895
(2) 1,884
(3) 1,246
C. (1) 2,620
(2) 1,035
(3) 1,630
D. (1) 123
(2) 555
(3) 146
E. (1) 404
(2) 333
(3) 619
F. (1) 66
(2) 177
(3) 657
G. (1) 31,251
(2) 14,820
(3) 13,033
H. (1) 3,983
(2) 79
(3) 5,573
I. (1) 166
(2) 35,304,025
(3) 26 years
J. (1) 2,454,184,212
(2) 114
(3) 3,036 houses

STANDARD II.

A. (1) 320,994
(2) 103,648
(3) 134,034
B. (1) 7,656
(2) 29,889
(3) 88,496
C. (1) 595,672
(2) 411,708
(3) 834,444
D. (1) 3,222,540
(2) 4,696,800
(3) 6,146,376
E. (1) 14,683,184
(2) 40,284,671
(3) 455,827,400
F. (1) 6,349
(2) 9,450+1
(3) 16,059
G. (1) 12,173+2
(2) 9,789
(3) 5,888+5
H. (1) 2,948+2
(2) 8,576
(3) 6,989+10
I. (1) 45,354,730
(2) 156 times
(3) 769 sheep; 606 sheep
J. (1) 6s. 7d.; 7s. 11d.; 9s. 10d.
(2) 43 nuts
(3) 895 marbles

STANDARD III.

A. (1) 2,538
(2) 965+7
(3) 1,900+29
B. (1) 4,708
(2) 7,059
(3) 10,454+78
C. (1) 30,405
(2) 8,970
(3) 9,997+46
D. (1) 3,807+917
(2) 6,007
(3) 10,126+6,554
E. (1) £212 17s. 5d.
(2) £327 18s. 1½d.
(3) £1,712 11s. 4½d.
F. (1) £29,553 0s. 1½d.
(2) £16,795 4s. 6½d.
(3) £77,150 3s. 2d.
G. (1) £307 17s. 8d.
(2) £6 5s. 10½d.
(3) £913 12s. 10½d.
H. (1) £1,517 12s. 6½d.
(2) £568 14s. 10½d.
(3) £9,000 19s. 11½d.
I. (1) 785 books
(2) £2 17s. 11½d.
(3) £1 18s. 11½d.
J (1) 1,293,183 halfpence
(2) 8,090 times
(3) 14 days

ANSWERS TO ALGEBRA QUESTIONS IN 'THE SCHOLAR,' FOR FEBRUARY, 1883.

EXERCISE XV.

(1) 42. (2) 72. (3) 7. (4) 180. (5) 112. (6) 32 years. (7) 40, 60. (8) 24, 36. (9) 15 marbles. (10) 41, 19. (11) 80 sheep. (12) 36 feet. (13) Tom 20, Dick 64, and Harry 86 marbles. (14) 21. (15) 1224 and 1791 votes. (16) 1s. 3d. and 6s. 3d.

—o—

The New Class-Subject, 'Elementary Science.'

(What to teach, and how to teach it.)

BY RICHARD BALCHIN.

FOR the first time in the history of national education, a grant is to be given *direct*, for the teaching of elementary science. *Indirectly*, this subject has received pecuniary encouragement ever since there has been a system of national education. I remember, when a pupil teacher, some thirty years ago, that the head-master of the school, Mr. Colin Russell Roberts, was a very enthusiastic teacher of science, and especially of 'social science,' a subject that then received considerable attention. As a result of this teaching, there was an amount of manly intelligence and sharpness about the boys that I have seldom seen equalled. The inspector, Mr. Matthew Arnold, set a very high estimate upon these results. Good reports and good grants followed accordingly. Here, then, was a payment made indirectly for the teaching of elementary science. At that time, we did not call the subject by this name, we called it 'object-teaching.' But afterwards there came a code. Particular subjects were now paid for in a *direct* manner, and general intelligence, in a very *indirect* manner. In fact, so 'indirectly' that, to some minds, it did not appear to have any value at all set upon it; so it often passed into the background. Nevertheless, some few teachers have since this time continued to teach elementary science, believing in its efficacy as an educative power. The 'grant indirect' has not indeed always followed so 'accordingly' as it did before. Still, these few educationalists have not been discouraged; for there have always been some inspectors, who, having formed a true and noble conception of what it is to educate a child, do not in their reports lightly pass over the honest endeavours of teachers to cultivate intelligence and manliness among their scholars.

Now, however, there is to be an improvement. The Government, feeling that of late the instruction in elementary schools has grown to be somewhat mechanical, has framed a code which is intended to remedy such defect. It is sought to infuse a little of *soul* into our teaching by giving encouragement to various efforts for developing the intellectual capabilities of the children. Here, then, is a great move onwards. No one will find fault with this advance, even should it be discovered that the first stage in it is to take a step backwards some thirty years and revive something that then existed. Of course I do not mean to say that the teaching of elementary science is the only way of securing intellectual growth; for any subject taught intelligently will do so, more or less; but I firmly believe that 'science-teaching' will attain this end better than any other subject. And I assume the Education Department entertains a similar view, and has therefore introduced it as a class-subject. The School Board for London seems to have arrived at the same conclusion; for, by a recent circular, it has insisted that elementary science shall be taught in all Metropolitan schools. I observe, further, that some members appear to be even anxious to revive the almost forgotten subject, 'Social Science.'

It is, therefore, quite clear that elementary science is henceforth to occupy an important place in the curriculum of our primary schools. I purpose in these articles, 1st, to submit a detailed syllabus of a year's course of lessons in this subject for each standard; 2nd, to give the entire subject-matter for each lesson; and, 3rd, to illustrate my methods of teaching by reproducing a few lessons actually given. In short, it is my intention, that these articles shall form a complete text-book of matter and method.

For our guide as to what shall be taught, we have, 1st, the syllabus of the Education Department, and, 2nd, the circular issued by the London School Board. In the former it is stated that for Standard I. 'there shall be given a progressive course of simple lessons on common objects, such as familiar animals, plants, and substances employed in ordinary life,' such lessons to aim at the cultivation of 'habits of exact observation, statement, and reasoning.' In the latter, teachers are instructed to extend 'the object lessons in the Infant School, with simple illustrative experiments.' This is all the official information we have, so far as Standard I. is concerned, and I may add, all we need. The main purpose of this teaching is well stated in the Code, as being nothing less than the cultivation of *habits* of exact observation, exact statement, and exact reasoning. Now, if we are going to form *habits*

at all, the earlier we begin the better: hence the wisdon of starting with Standard I. If this process of 'habit-forming' be continued systematically throughout the school, we may hope that a Seventh Standard child will at least begin to observe, state, and reason, with exactitude. And that he will do this with a minimum of effort, for this is what *habit* implies.

The following is a syllabus for a year's course of lessons for Standard I.

PART I.—THINGS IN OUR HOUSES.

(*a*) FOOD.

1. *Food*, generally: why we eat and drink.
2. *Bread:* different kinds of corn: wheat, barley, oats.
3. *Meat:* Sheep, cow, fish, poultry.
4. *Drinks:* Water, milk, tea, coffee, beer.
5. *Vegetables:* Cabbages, turnips, carrots, peas, beans.
6. *Fruits:* Apples, pears, oranges, plums, currants.

(*b*) DRESS.

1. Dress, generally: Why we dress.
2. Cotton, wool, linen, silk, leather.

(*c*) FURNITURE.

1. *Articles of wood:* (*a*) of pine, (*b*) of mahogany, (*c*) of hard wood.
2. *Articles of iron:* Fire-place, cast-iron; poker, etc., wrought iron; knives, etc., steel.
3. *Articles of glass:* Windows, glasses, looking-glass; outlines of glass-making.

(*d*). MONEY.

1. *Money, generally.* Meaning of money, why used.
2. *Coins.* Gold coins, silver and bronze: shells as money.
3 *Bank notes.* Meaning of a bank note.

PART II.—THINGS IN THE STREETS.

(*a*) STONES.

1. *Stones of the pavement, i.e.*, sandstones.
2. *Stones of the kerb* and road, *i.e.*, granite.
3. *Stones of the houses, i.e.*, limestone.

(*b*) GAS AND LIGHTING.

1. How gas is made.
2. Other ways of lighting.

(*c*) CARRIAGES.

1. Cabs, omnibuses, tram-cars, use of laying *rails.*

PART III.—THINGS IN THE SCHOOL.

(*a*) BOOKS.

1. *Old style* of *writing* books—*i.e.*, on skins, bark, etc.
2. *Printing* and paper.

(*b*) SLATE and CHALK.

(*c*) INK.

(*d*) COAL.

PART IV.—OTHER COMMON THINGS.

(*a*) Common wild plants.

1. Buttercup, daisy, primrose, bluebell.
2. Poisonous wild plants.

(*b*) Common trees.

1. The lime-tree, its peculiar flowers; how to tell a lime-tree.
2. The fir; its wood; how to tell a fir-tree.
3. The elm, chestnut.

(*c*) Common animals that work for us.

1. Horse, camel, reindeer, elephant—*i.e.*, beasts of burden.
2. Silkworms, bees, coral animal.

PART V.—MISCELLANEOUS SUBJECTS.

(*a*) HEALTH.

1. Fresh air, meaning and use.
2. Clean bodies and clean clothes.
3. Happy disposition, how formed.
4. Proper food.

(*b*) WATER.

1. General properties of water.
2. Water on the land: oceans, seas, lakes, rivers.
3. Water in the air: clouds, dew, rain, hail, snow, and hoar-frost.

(*c*) AIR.

1. General properties of air.
2. Pressure of the air.
3. Dense and rare air, or thick and thin air, balloons.

This syllabus embraces a course of about forty lessons. If two are given per week the whole syllabus may be gone over twice in the course of the year. In the first half-year the instruction will be exceedingly elementary. In all cases, specimens should if possible be shown, and simple experiments performed. In the next article I will reproduce a lesson given to my first standard on 'Food Generally; why we Eat and Drink.'

—o—

Correspondence.

23, Field Street, Bloxwich,
January 12th, 1883.

To the Editor of the PRACTICAL TEACHER.

DEAR SIR,—Kindly insert in your next issue of the PRACTICAL TEACHER the enclosed, for benefit of Mr. Martin and other readers of the PRACTICAL TEACHER. The question will be found on page 554 of January number.

And oblige,
Yours truly,
H. WALKER.

GRAMMATICAL QUESTIONS.

First year's Grammar for Pupil Teachers' Examination, July 29th, 'Flow softly down,' etc. Tennyson's 'A Farewell.' Second year's, 'Take warning,' etc. Tennyson's 'The Blackbird.'

First year's, November 25th, 'Not wholly in the living world,' etc. Tennyson's 'Gardener's Daughter,' lines 34-43.

Third year, November 25th, 'And now farewell,' etc. Tennyson's 'Morte D'Arthur' (near the end).

The cheapest volume of Tennyson's poems is that published by Kegan Paul and Co., London, price 6s.

Query Column.

RULES.

1. Each correspondent is restricted to *one question*. We should be much obliged if correspondents who send numerical or algebraical questions for solution, and are able from any source to give the required answer, would do so. It would save much time at present spent on verification.

2. No query can be answered unless accompanied by the real name and address of the sender, not necessarily for publication, but as a guarantee of good faith and for facility of reference.

3. **When a pseudonym is adopted it should be written at the end of the query, and the real name and address on a separate piece of paper.**

4. Correspondents are requested to write their queries *legibly*, and on one side of the paper only.

5. Replies will not be sent through the post.

6. Queries must reach the office *not later than the 12th of the month*, or they cannot be attended to in the following issue.

*** All communications for this column should be addressed—'*The Query Editor*,' *The Practical Teacher Pilgrim Street, Ludgate Hill, London, E.C.*

Arithmetic.

1. POOL.—How many lbs. of tobacco at 5s. 8d. a lb. must be mixed with 4 lbs. at 6s. 6d., so that the mixture may be sold at 7s. 10d. a lb., and 33⅓ per cent. gained on the outlay?

£	s. d.	£	
133⅓	: 7 10	:: 1$\frac{6}{9}$	: Cost price of mixture
3	3		
4$\frac{6}{9}$	23 6		
	5 10½		

Difference between cost price of mixture and first kind
= 5s. 10½d. − 5s. 8d.
= 2½d.
Difference between cost price of mixture and second kind
= 6s. 6d. − 5s. 10½d.
= 7½d.
∴ Quantity of 1st kind : Quantity of 2nd kind
:: 7½d. : 2½d.
:: 15 : 5
:: 3 : 1.
∴ There must be 12 lbs. at 5s 8d. to 4 lbs. at 6s. 6d. Ans.

2. M. G.—Find the true discount on £457 18s., drawn September 12th at 5 months, at 4 per cent.?
Bill is due on February 15th.

No. of days from September 12th to February 15th
= 156.

$\frac{1}{365}$ of £4 = £$\frac{4}{365}$ = £1$\frac{39}{365}$.

£	£ s.	£	
∴ 101$\frac{39}{365}$	: 457 18	:: 1$\frac{39}{365}$	: Discount
365	20	365	
37124	9158	6574	
9281	156	156	
	54948		
	45790		
	9158		

9281)1428648(153s.
9281
50054
46405
36498
27843
8655
12
103860(11d.
9281
11050
9281
1769

∴ Discount = £7 13s. 11$\frac{1769}{9281}$d. Ans.

3. BILL AND WILLIE.—I bought 128 yards of cloth for £100, and am now forced to sell it at a loss of as much money as I shall receive for 12 yards. At what price per yard am I selling it?

As the cloth is sold at a loss of as much money as is received for 12 yards,
∴ Selling price per yard = £100 ÷ (128 + 12)
= £100 ÷ 140
= £$\frac{5}{7}$
= 14s. 3$\frac{3}{7}$d. Ans.

4. LOUIE.—Simplify :—

$(\frac{1}{3\frac{1}{8}}$ of $3\frac{1}{3}) + (\frac{3}{8} \div \frac{37}{64}) - \left(\frac{1}{1\frac{1}{7}} - \frac{1\frac{1}{3}}{3}\right) \div (2 - \frac{6}{8})$.—(*Barnard Smith.*)

$$(\tfrac{1}{3\frac{1}{8}} \text{ of } 3\tfrac{1}{3}) + (\tfrac{3}{8} \div \tfrac{37}{64}) - \left(\frac{1}{1\frac{1}{7}} - \frac{1\frac{1}{3}}{3}\right) \div (2 - \tfrac{6}{8})$$

$$= \left(\frac{1}{\frac{25}{8}} \text{ of } \frac{\overset{4}{\cancel{10}}}{\underset{2}{\cancel{4}}}\right) + \left(\frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{8}}} \times \frac{\overset{8}{\cancel{64}}}{\underset{9}{\cancel{37}}}\right) - \left(\frac{\overset{1}{\cancel{1}}}{\underset{7}{\cancel{8}}} - \frac{\overset{4}{\cancel{4}}}{\underset{1}{\cancel{3}}}\right) \div 1\tfrac{2}{8}$$

$$= \tfrac{1}{4} + \tfrac{8}{9} - (\tfrac{7}{8} - \tfrac{4}{8}) \div 1\tfrac{2}{8}$$

$$= \frac{9 + 64}{72} - \frac{63 - 32}{72} \div 1\tfrac{2}{8}$$

$$= \tfrac{73}{72} - \frac{31}{7\cancel{2}} \times \frac{\overset{8}{\cancel{9}}}{13}$$

$$= \tfrac{73}{72} - \tfrac{31}{104}$$

$$= \frac{949 - 279}{936}$$

$$= \tfrac{670}{936}$$

$$= \tfrac{335}{468}.$$ Ans.

5. GLENERY.—(1) $\frac{1}{10} - \frac{1}{2} \times \frac{1}{5} = \frac{1}{10} - \frac{1}{10}$.

(2) $\frac{1}{2} - \frac{1}{4} \div \frac{1}{8} = \frac{1}{2} - \frac{1}{\cancel{4}} \times \frac{\overset{2}{\cancel{8}}}{1} = \frac{1}{2} - 2$.

(3) $\frac{1}{2} \div \frac{1}{8} - \frac{1}{4} = \frac{1}{\cancel{2}} \times \frac{\overset{4}{\cancel{8}}}{1} - \frac{1}{4} = 4 - \frac{1}{4}$.

(4) $\frac{1}{2} \div \frac{1}{4} \times \frac{1}{8} = \frac{1}{2} \times \frac{\cancel{4}}{1} \times \frac{1}{\cancel{8}} = \frac{1}{4}$.

(5) $\frac{1}{2} \times \frac{1}{4} \div \frac{1}{8} = \frac{1}{2} \times \frac{1}{4} \times \frac{\overset{2}{\cancel{8}}}{1} = 1$.

Rule.—When quantities have to be added or subtracted, simplify first those connected by the multiplication or division sign with another quantity, before performing the addition or subtraction. For example (1), (2), and (3), and see No. 4 Query in Arithmetic from Barnard Smith.
When quantities are connected by the multiplication and division signs only, perform the operations in order.
Quantities connected by '*of*' must always be taken together.

Note.—Elliot's 'Mensuration' is published by Hughes.

6. DAMON AND PYTHIAS.—If a person invest £25,350 in the 3 per cents. at 92⅛, at what price must he sell out after receiving the dividend to make a profit of £250? (*Brooke Smith.*)

£ £ £
$92\frac{3}{8} : 25{,}350 :: 1\frac{1}{2}$: Half-yearly dividend

650 4
$= \frac{\cancel{25350} \times 3 \times \cancel{4}}{\cancel{741} \times \cancel{2}}$ £

19
$= £\frac{1900}{10}$

$= £410\frac{8}{10}$.

Sum lost on selling out $= £410\frac{8}{10} - £250$
$= £160\frac{8}{10}$.

£ £ £
∴ $25{,}350 : 92\frac{3}{8} :: 160\frac{8}{10}$: Decrease in price of stock

19 61
$= \frac{741 \times \cancel{25850}}{\cancel{25350} \times 8 \times 19}$ £

650
13
$= £\frac{65}{104}$.

∴ Selling price $= £92\frac{3}{8} - £\frac{65}{104}$
$= £92\frac{7}{104}$. Ans.

7. H. GOODHEAD.—The first-class fare on a railway is $1\frac{3}{10}$ times the second-class fare, and it is found that 140 first-class, 250 second-class, and 520 third-class passengers can go 24 miles for £124. But because of a Government duty all fares are raised 5 per cent., and then 240 first-class, 120 second-class, and 1080 third-class passengers can travel 120 miles for £945. What was the original third-class fare per mile? (*Excise, May*, 1882.)

Before duty is levied,
$(140 \times 1\frac{3}{10} + 250)$ original second-class fares + 520 original third-class fares $= £\frac{1344}{5}$ per mile,
∴ 432 original second-class fares + 520 original third-class fares $= £\frac{24}{5}$ per mile. (1)

After duty is levied,
$(240 \times 1\frac{3}{10} + 120)$ second-class fares + 1080 third-class fares $= £\frac{1848}{10}$ per mile,
432 second-class fares + 1080 third-class fares $= £\frac{84}{5}$ per mile,
∴ 432 original second-class fares + 1080 original third-class fares $= £(\frac{84}{5} \times \frac{21}{22})$ per mile,
$= £\frac{147}{55}$ per mile. (2)

Subtracting (1) from (2),
(1080 − 520) original third-class fares $= £(\frac{147}{55} - \frac{24}{5})$ per mile,
560 original third-class fares $= £\frac{7}{55}$ per mile,
∴ Original third-class fare per mile

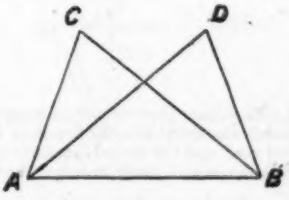
$$= £\left(\frac{7}{3} \times \frac{1}{\cancel{560}}\right)$$
80

$= £\frac{1}{1760}$
$= 1$d. Ans.

NOTE.—There is great room for improvement in your writing.

Geometry.

1. NAGROM.—Given three points in the circumference of a circle, required to find a fourth.



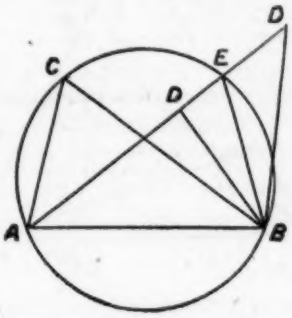
Let A, B, C be the three given points in the circumference, it is required to find a fourth.

Join AB, BC, CA.

At the point A make the angle BAD equal to the angle ABC, and at the point B make the angle ABD equal to the angle BAC. (I. 23.)

Then the point D is the fourth point in the circumference of the circle.

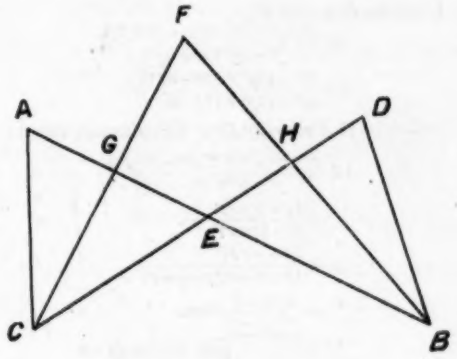
PROOF.—If the circle be described passing through A, B, C, it will also pass through D; if it do not pass through D, then the point D must fall either within or without the circumference.



If possible, let AD or AD produced cut the circumference in E. Join EB.

Then the angle AEB = the angle ACB; (III. 21.)
But ,, ,, ADB = ,, ,, ,, ; (I. 32.)
∴ ,, ,, AEB = ,, ,, ADB; (Ax. 1.)
But this is impossible; (I. 16.)
∴ the point D is in the circumference. Q. E. F.

2. ANXIOUS.—AEB, CED are two straight lines intersecting at E; straight lines AC, DB are drawn forming two triangles ACE, BED; the angles ACE, DBE are bisected by the straight lines CF, BF, meeting in F. Show that the angle CFB is equal to half the sum of the angles EAC, EDB. *(Todhunter.)*

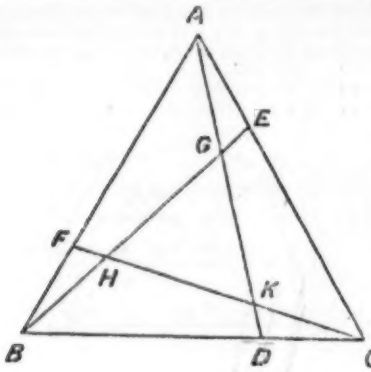


PROOF.—Angle CGB = angles CFB, FBE, (I. 32.)
and ,, ,, = ,, EAC, ACF, ,,
∴ Angles CFB, FBE = angles EAC, ACF.
Again, angle BHC = angles CFB, FCE,
and ,, ,, = ,, EDB, DBF,
∴ Angles CFB, FCE = angles EDB, DBF.
Wherefore, twice angle CFB + angles FBE, FCE
= angles EAC, EDB, ACF, DBF;
but, angle FBE = angle DBF,
and ,, FCE = ,, ACF,
∴ Twice angle CFB = angles EAC, EDB, (Ax. 3.)
Wherefore angle CFB is equal to half the sum of the angles EAC, EDB.

Q. E. D.

3. TRURON.—ABC is an equilateral triangle. On AB take any distance AF, on BC take BD equal to AF, and on CA take CE equal to AF. Join AD, BE, and CF. Show that these three lines either meet in one point, or enclose an equilateral triangle.

PROOF.—In the triangles ABE, CAD,
the two sides BA, AE = the two sides AC, CD, each to each,
and the angle BAE = the angle ACD (I. V. Cor.)
∴ the triangles are equal in all respects, (I. 4.)
wherefore angle ABE = angle CAD,



The angle HGK = angles GBA, BAG, (I. 32.) but the angle GBA has been proved to be equal to the angle CAD,

∴ angle HGK = angles CAD, BAD,
= angle BAC.

Similarly the angle GHK can be proved equal to the angle ABC, and the angle GKH to the angle ACB;

Therefore the triangle HGK is equiangular; wherefore it is equilateral. (I. VI. Cor.)

NOTE.—When the distances are half the sides, the three lines meet in one point. (See deduction in our issue for October, 1882.)

Algebra.

1. INQUISITIVE.—Simplify—

(1) $\frac{p^2+q^2+r^2+2(qr+rp+pq)}{p^2-(q^2+r^2+2qr)}$,

(2) $\frac{3p^3-16p^2+23p-6}{2p^3-11p^2+17p-6}$

(*Edinburgh University Local Examination*, 1882.)

(1) $\frac{p^2+q^2+r^2+2(qr+rp+pq)}{p^2-(q^2+r^2+2qr)}$

$=\frac{(p+q+r)^2}{p^2-(q+r)^2}$

$=\frac{(p+q+r)^2}{(p+q+r)(p-q-r)}$

$=\underline{\frac{p+q+r}{p-q-r}}$. Ans.

(2) $3p^3-16p^2+23p-6$

$2p^3-11p^2+17p-6\overline{)6p^3-32p^2+46p-12}\,(3$
$\underline{6p^3-33p^2+51p-18}$
p^2-5p+6

$p^2-5p+6\overline{)2p^3-11p^2+17p-6}\,(2p-1$
$\underline{2p^3-10p^2+12p}$
$-p^2+5p-6$
$\underline{-p^2+5p-6}$

$\therefore \frac{3p^3-16p^2+23p-6}{2p^3-11p^2+17p-6}$

$=\underline{\frac{3p-1}{2p-1}}$. Ans.

2. A. B.—A person has 200 coins, consisting of guineas, half-sovereigns, and half-crowns: the sums of money in guineas, half-sovereigns, and half-crowns are as 14 : 8 : 3; find the number of the different coins.

Let x = no. of guineas,
" y = " half-sovereigns,
and " z = " half-crowns;
then $21x$ = value of guineas in shillings,
$10y$ = " half-sovereigns in shillings,
and $\frac{5z}{2}$ = " half-crowns in shillings.

$\therefore 21x : 10y :: 14 : 8$
$21x : 10y :: 7 : 4$
$3x : 5y :: 1 : 2$
$5y = 6x$
$\therefore \underline{y = \frac{6x}{5}}$.

$\therefore 21x : \frac{5z}{2} :: 14 : 3$
$21x : 5z :: 7 : 3$
$3x : 5z :: 1 : 3$
$5z = 9x$
$\therefore \underline{z = \frac{9x}{5}}$.

But, $x + y + z = 200$
$\therefore x + \frac{6x}{5} + \frac{9x}{5} = 200$
$x + \frac{15x}{5} = 200$
$4x = 200$
$\therefore \underline{x = 50}$.

$\therefore$ No. of guineas $= \underline{50}$,
" half-sovereigns $= \frac{6}{5}$ of $50 = \underline{60}$,
" half-crowns $= \frac{9}{5}$ of $50 = \underline{90}$.

3. IMPRIMATUR.—Solve :—

$$\left.\begin{aligned} xy &= x + y \\ xz &= 2(x + z) \\ yz &= 3(y + z) \end{aligned}\right\} \quad (\textit{Colenso.})$$

(1) $xy = x + y$
$xy - y = x$
$(x-1)y = x$
$\therefore \underline{y = \frac{x}{x-1}}$.

(2) $xz = 2(x + z)$
$xz - 2z = 2x$
$(x-2)z = 2x$
$\therefore \underline{z = \frac{2x}{x-2}}$.

(3) $yz = 3(y + z)$

$\frac{x}{x-1} \times \frac{2x}{x-2} = 3\left(\frac{x}{x-1} + \frac{2x}{x-2}\right)$

$\frac{2x^2}{(x-1)(x-2)} = \frac{3(x^2-2x+2x^2-2x)}{(x-1)(x-2)}$

$2x^2 = 3(3x^2-4x)$
$= 9x^2 - 12x$
$7x^2 = 12x$
$7x = 12$
$\therefore \underline{x = 1\frac{5}{7}}$.

$y = \frac{x}{x-1} = \frac{\frac{12}{7}}{\frac{5}{7}} = 2\frac{2}{5}$,

And $z = \frac{2x}{x-2} = \frac{\frac{24}{7}}{-\frac{2}{7}} = \underline{-12}$.

4. E. E. H. W.—Three persons can complete a piece of work in 60 days; and it was found that the first does three-fourths of what the second does, and the second four-fifths of what the third does; in what time can each alone complete the work?

Let x = part done by third,
Then $\frac{4x}{5}$ = " " second,
And $\frac{3}{4}$ of $\frac{4x}{5}$ or $\frac{3x}{5}$ = " " first;
$\therefore x + \frac{4x}{5} + \frac{3x}{5} = 1$
$12x = 5$
$\therefore \underline{x = \frac{5}{12}}$.

Part done by third in 60 days $= \frac{1}{12}$,
" " " 1 day $= \frac{1}{720}$ of $\frac{1}{12}$
$= \frac{1}{1440}$;
" " second in 60 days $= \frac{6}{7}$ of $\frac{6}{77}$
$= \frac{1}{3}$,
" " " 1 day $= \frac{1}{1320}$;
" " first in 60 days $= \frac{6}{7}$ of $\frac{6}{77}$
$= \frac{1}{4}$,
" " " 1 day $= \frac{1}{240}$.

∴ First can do the work in 240 days, second in 180 days, and third in 144 days.

Note.—The 1st day of June, 1851, fell on Sunday.

5. PEVERIL.—A person drew a quantity of wine from a full vessel, which held 81 gallons, and then filled up the vessel. He then drew from the mixture as much as he before drew of pure wine, and it was found that 64 gallons of pure wine remained. Find how much he drew each time. (*Todhunter.*)

Let x = quantity drawn out each time,
Then $81 - x =$ " of pure wine remaining after first time,
And $\frac{x}{81}$ of $(81 - x) =$ " " taken second time;

$$\therefore x + \frac{x(81-x)}{81} = 17$$
$$81x + 81x - x^2 = 1377$$
$$x^2 - 162x = -1377$$
$$x^2 - 162x + (81)^2 = 6561 - 1377$$
$$= 5184$$
$$x - 81 = \pm 72$$
$$x = \pm 72 + 81$$
$$\therefore x = 153 \text{ or } 9.$$

The value 153 is inapplicable.

∴ Quantity drawn each time = 9 gallons.

Note.—Writing pretty good, but it would be greatly improved if the *t's* were not crossed, and the capitals devoid of flourishes.

Mensuration.

1. BIRDIE.—Seven men bought a grinding-stone of 60 inches in diameter; each paying $\frac{1}{7}$th part of the expense, what part of the diameter must each grind down for his share?

Circles are to one another as the squares of their diameters.

(Diameter of circle – diameter of 1st part)^2 $= \frac{6}{7}$ of $(60 \text{ in.})^2$
$= \frac{21600}{7}$ sq. in.

Diameter of circle – diameter of 1st part $= \sqrt{\frac{21600}{7}}$ in.
$= \sqrt{\frac{21600 \times 7}{7 \times 7}}$ in.
$= \frac{\sqrt{151200}}{7}$ in.
$= \frac{388{\cdot}8444}{7}$ in.
$= 55{\cdot}5492$ in.

∴ Diameter of 1st part $= (60 - 55{\cdot}5492)$ in.
$= 4{\cdot}4508$ in.

(Diameter of circle – diameter of 1st and 2nd parts)^2 $= \frac{5}{7}$ of $(60 \text{ in.})^2$
$= \frac{18000}{7}$ sq. in.

Diameter of circle – diameter of 1st and 2nd parts $= \frac{\sqrt{126000}}{7}$ in.
$= \frac{354{\cdot}9647}{7}$ in.
$= 50{\cdot}7092$ in.

∴ Diameter of 2nd part $= (55{\cdot}5492 - 50{\cdot}7092)$ in.
$= 4{\cdot}84$ in.

(Diameter of circle – diameter of 1st, 2nd, and 3rd parts) $= \frac{4}{7}$ of $(60 \text{ in.})^2$
$= \frac{14400}{7}$ sq. in.

Diameter of circle – diameter of 1st, 2nd, and 3rd parts $= \frac{\sqrt{100800}}{7}$ in.
$= \frac{317{\cdot}4901}{7}$ in.
$= 45{\cdot}3557$ in.

∴ Diameter of 3rd part $= (50{\cdot}7092 - 45{\cdot}3557)$ in.
$= 5{\cdot}3535$ in.

(Diameter of circle – diameter of 1st, 2nd, 3rd, and 4th parts)^2 $= \frac{3}{7}$ of $(60 \text{ in.})^2$
$= \frac{10800}{7}$ sq. in.

Diameter of circle – diameter of 1st, 2nd, 3rd, and 4th parts $= \frac{\sqrt{75600}}{7}$ in.
$= \frac{274{\cdot}9545}{7}$ in.
$= 39{\cdot}2792$ in.

∴ Diameter of 4th part $= (45{\cdot}3557 - 39{\cdot}2792)$ in.
$= 6{\cdot}0765$ in.

(Diameter of circle – diameter of 1st, 2nd, 3rd, 4th, and 5th parts)^2 $= \frac{2}{7}$ of $(60 \text{ in.})^2$
$= \frac{7200}{7}$ sq. in.

Diameter of circle – diameter of 1st, 2nd, 3rd, 4th, and 5th parts $= \frac{\sqrt{50400}}{7}$ in.
$= \frac{224{\cdot}4994}{7}$ in.
$= 32{\cdot}0713$ in.

∴ Diameter of 5th part $= (39{\cdot}2792 - 32{\cdot}0713)$ in.
$= 7{\cdot}2079$ in.

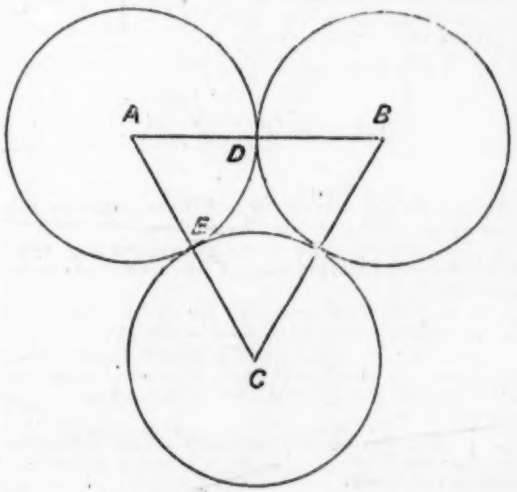
(Diameter of circle – diameter of 1st, 2nd, 3rd, 4th, 5th, and 6th parts)^2 $= \frac{1}{7}$ of $(60 \text{ in.})^2$
$= \frac{3600}{7}$ sq. in.

Diameter of circle – diameter of 1st, 2nd, 3rd, 4th, 5th, and 6th parts $= \frac{\sqrt{25200}}{7}$ in.
$= \frac{158{\cdot}745}{7}$ in.
$= 22{\cdot}6778$ in.

∴ Diameter of 6th part $= (32{\cdot}0713 - 22{\cdot}6778)$ in.
$= 9{\cdot}3935$ in.

Diameter of 7th part = diameter of circle – diameter of 1st, 2nd, 3rd, 4th, 5th, and 6th parts;
∴ Diameter of 7th part $= 22{\cdot}6778$ in.

2. J. EDWARDS.—Three equal circles, each 10 inches in diameter, touch one another externally; find the area of the space included between them. (*Excise, November*, 1879.)



Area of space between the circles = area of equilateral triangle ABC – 3 times area of sector ADE
= area of an equilateral triangle of side 10 inches – 3 times ($\frac{1}{6}$ area of circle of diameter 10 inches)
$= (\cdot433 \times 10^2)$ sq. in. $- (\frac{1}{6} \times 10^2 \times \cdot7854)$ sq. in.
$= 43{\cdot}3$ sq. in. $- 39{\cdot}27$ sq. in.
$= 4{\cdot}03$ sq. in. Ans

NOTE.—Writing pretty fair.

3. JOHN HALIFAX.—Find the diameter of a circle which is less than the circumference by 10 feet.

Circumference = Diameter × $3\frac{1}{7}$ (nearly).

When the diameter is 1 foot, the circumference is $3\frac{1}{7}$ feet.

∴ When the diameter is 1 foot, it is less than the circumference by $2\frac{1}{7}$ feet.

∴ Diameter = $\frac{10}{2\frac{1}{7}}$ feet

$= \frac{70}{15}$,,

$= 4\frac{10}{15}$,,

$= 4\frac{2}{3}$ feet. Ans.

General.

1. W. T. D. and A. J. T.—(1) *I know*, princ. sent.; *I*, subject; *know*, predicate; *when he died*, subordinate noun sentence, objective to *know*; *when*, connective; *he*, subject; *died*, predicate. (2) The second sentence is analysed in a similar way, except that *when he died* is a subordinate adjective sentence in adjectival relation to *time*.

2. CYMBRO BACH.—(*a*) *Master*, nominative of address or vocative, extra sentential. *Who*, subject; *did*, predicate; *this*, object. (*b*) *As long as I am in the world*, subordinate adverbial sentence to *I am the light of the world*. *As long as*, connective; *I*, subject; *am in the world*, predicate; (*c*) *Go, wash in the Pool of Siloam*. (*Thou*), subject; *go*, predicate. (*Thou*), subject; *wash*, predicate; *in the Pool of Siloam*, adverbial adjunct. (*d*) *He went his way therefore*. *He*, subject; *went*, predicate; *his way*, object (cognate); *therefore*, adverbial adjunct. (*e*) *That he was blind*, noun sent. in objective relation to *seen*. The verb *seen* has also a redundant object in *him*.

3. H. R. OGDEN.—The *third* (of the chord) major or minor regulates the chord, *i.e.*, makes it major or minor. In (1) the F sharp is 4 semitones above (1) the tonic or key-note; and this F sharp is thus a *major third* from D. If the F had been left natural it would have been only 3 semitones above D, and the chord would have been *minor*. For the same reason (2), G being 3 semitones only above E is *minor*, and makes the chord also *minor*. The same applies to (3) B flat, being but 3 semitones above G. Had B been left natural the chord would have been *major*. (4) Is either copied wrong or *indefinite*, the third (E), the regulating interval, being omitted. In (5) the full chord is given with the major third; in (6) with the minor third, E flat.

4. ASHBURTON.—Your question cannot be solved by arithmetic, and the process by Algebra is so very complicated and lengthy, that we cannot give the time nor space for its solution. We will, however, show you a method of solution, so that you can work it out for yourself.

If x = an annual payment in pounds,

Then, $12x = 1{,}050 + \frac{1}{10}(1{,}050 - x) +$

$$\frac{1}{10}\left\{1{,}050 - 2x + \frac{1050 - x}{20}\right\} +$$

$$\frac{1}{10}\left\{1{,}050 - 3x + \frac{1050 - 2x + \frac{1050 - x}{20}}{20} + \frac{1050 - x}{20}\right\} + \ldots.$$

This is to the end of fourth year, and if you proceed similarly to the end of twelfth year, you will form the equation.

5. J. G.—The answer to the question (Fourth Year, PRACTICAL TEACHER, Examination Paper, July, 1882) should be 675 square feet.

6. T. D.—The meaning is simply that £20 shares are worth £25, and therefore shares for £100 are worth £25 × 5 or £125.

7. J. M. W.—The answer should be given in English money, not French. He receives 400 francs for his debt, but the value of those francs is only £16, and therefore his loss is 5s.

8. SMUT.—No.

9. Q.—The class has been abandoned, and the Examination Questions (with Model Ans.) to various university and other examinations substituted.

10. N.B.—We have made enquiries for you, but can find no announcement of 'The Analytical Classical Series,' other than that issued by Messrs. Simpkin and Co.

11. AGAMEMNON.—*Mr. Francon Williams*' 'Geography of the Oceans.' Published at 2s. 6d. Any bookseller can get it for you.

12. RALPHO.—The Code has not changed on the point you name.

13. VILLAGE T.—It would be impossible (within the limits o space assigned us) to recommend books for all subjects. Consult your nearest certificated teacher. If you want advice on one or two special subjects we shall be happy to help you.

14. SEMPER FIDELIS.—Yes, Battersea is a CHURCH Training College. The secretary would doubtless give you any information you want. Early in our next volume we hope to publish full particulars of all the training colleges for the convenience of our readers.

15. ROMEO.—*Ichth* is the first syllable of a Greek word meaning fish.

16. G. W. R.—(*a*) No; not unless the remainder of the term is at least equal to two years; (*b*) see advertisements in daily papers for situation you would like.

17. MUSA.—(*a*) Cassell's 'Educational Year Book' would be of service, but see our answer to *Semper Fidelis*; (*b*) try Morris's or Mason's. Both are excellent.

18. DON'T KNOW.—She might be employed in present school as assistant; or improve herself by private study. The entrance fee varies with the college. Say what college you intend her to enter. See answer to *Semper Fidelis*.

19. CYMRO.—(*a*) Hughes's, published by Philip and Son, Fleet Street, or Dr. Morrison's, or Dr. Clyde's. See advertisements. (*b*) Sutton's or Hullah's. One of the special features of our next volume will be *Music for Students*, which will embrace the whole subject.

20. HABEAS CORP.—History, Curtis's; Grammar, Morell's or Mason's; Geography, Philip's. Read our advertisement columns carefully and you will easily find what you want.

21. BON SOIR.—No; it is not possible. Your writing is excellent.

22. E. T. R.—Write to Mr. Jennings, Tuition by Correspondence Office, Deptford, London.

23. FIDES.—(1) *Etiquette:* small book published at *Family Herald* office, also by Messrs. Ward, Lock and Co., Salisbury Square, Fleet Street, E.C. *Water-colour Painting*, Aaron Birley's and Leitch's. (2) Messrs. Trübner and Co., Ludgate Hill, London, E.C., sell foreign books; also Mr. D. Nutt, Strand, W.C. (3) Mansfield's Euclid, 1s. (Hughes) for a beginner.

24. HIGHAM.—Hullah's 'Time and Tune' (Longmans). Write to Mr. Thomas Murby, 32, Bouverie Street, Fleet Street, E.C., for his catalogue, in which you will find several cheap, well-written and suitable manuals on the subject. See our answer to *Cymro*.

25. HUROCO.—Your translation is very fair, and the alterations we could suggest are too trifling to mention.

26. COOPE.—Since Moses was *not* the son of Pharoah's daughter, it would be more correct to use the subjunctive 'were' instead of the indicative 'was,' in the first line of the passage you quote. The phrase 'the daughter-of-Pharoah' must be counted as one noun in order to make any sense of the passage.

27. CARACTACUS.—A fair idea of analysis can be obtained from the small primer on English grammar published by Macmillan.

28. MECHANICS.—You can hardly do better than get Todhunter's book.

29. F. W. M.—A solid right circular cone of homogeneous iron is 64 inches in height, and its mass is 8,192 lbs. The cone is cut by a plane perpendicular to the axis, so that the mass of the small cone removed is 686 lbs. Find the height of the centre of gravity of the truncated portion remaining above the base of the cone.

Solidity of cone : Solidity of small cone

:: (Height of cone)^3 : (Height of small cone)^3

∴ 8,192 lbs. : 686 lbs. :: (64 in.)^3 : (Height of small cone)^3

∴ (Height of small cone)^3 $= \frac{\cancel{686} \times 64 \times \cancel{64} \times \cancel{64}}{\cancel{8192}_{\cancel{128}_{2}}}$ cub. in.

$= (343 \times 64)$ cub. in.

∴ Height of small cone $= (7 \times 4)$ in.

$= 28$ in.

Centre of Gravity of cone = $\frac{1}{4}$ of height from base

= $\frac{1}{4}$ of 64 in. from base

= 16 in. from base;

,, ,, ,, small cone = $\frac{1}{4}$ of its height from its base

= $\frac{1}{4}$ of 28 in. from its base

= 7 in. from its base.

Let x = Height of Centre of Gravity of frustrum of cone above the base in inches

Then, $\{(8,192-686)\times x\}+\{686\times(64-28+7)\}=8,192\times 16$

$$7,506x+(686\times 43)=131,072$$
$$3,753x+14,749=65,536$$
$$3,753x=65,536-14,749$$
$$=50,787$$
$$\therefore x=\frac{50787}{3753}$$
$$=13\cdot532\ldots$$

∴ Height of Centre of Gravity of frustrum of cone above the base = 13·532 ... inches.

30. FRENSHAM, Farnham.—Having given the measure f of a certain acceleration with given units l and t of length and time, find the measure of the same acceleration with other given units l' and t'.

In second case, $f=\frac{l}{l'}\cdot\frac{t'^2}{t^2}$

31. 1st B.A., Farnham.—Two bodies A and B move with different accelerations from rest; A moves over $(a+b)$ feet in $(s-t)$ seconds, B moves over $(a-b)$ feet in $(s+t)$ seconds. If the units used are for A the inch and second, and for B the yard and minute, the measures of the accelerations are as 2 to 1, and the whole velocities gained by A and B in the above-mentioned times respectively are as 10 to $\frac{1}{2}$, prove that s is to t as 13 to 11, and a is to b as 43 to 7.

Let f = measure of acceleration of A, taking the foot and second,
Then $12f$ = " " " " inch and second;
Let x = " " B, " foot and second,
Then $\frac{60^2}{3}x$, or $1200x$ = measure of acceleration of B, taking the yard and minute;

$$\therefore 1200x=\tfrac{1}{2}\text{ of }12f$$
$$=6f$$
$$\therefore x=\tfrac{1}{200}f;$$
$$v=f(s-t),\text{ and }v'=\tfrac{1}{100}f(s+t),$$
$$\therefore f(s-t):\tfrac{1}{200}f(s+t)::10:\tfrac{5}{6}$$
$$s-t:\tfrac{1}{200}(s+t)::50:3$$
$$3(s-t)=\tfrac{1}{4}(s+t)$$
$$12(s-t)=s+t$$
$$11s=13t$$
$$\therefore s:t::13:11.$$
$$v^2=2f(a+b),\text{ and }v'^2=2\times\tfrac{1}{100}f(a-b)$$
$$\therefore 2f(a+b):\tfrac{1}{100}f(a-b)::10^2:(\tfrac{5}{6})^2$$
$$2(a+b):\tfrac{1}{100}(a-b)::100:\tfrac{25}{36}$$
$$\tfrac{1}{36}(a+b)=a-b$$
$$18a+18b=25a-25b$$
$$7a=43b$$
$$\therefore a:b::43:7.$$

32. PRINCE JOHN.—You will find the solution of your query (by arithmetic) in our issue for January, 1882.

33. M. H.—Percentage of child's share remaining after payment of legacy duty = 99, percentage of brother's = 97; product of these two numbers = 9,603. The sum £9,603 is taken for the supposition of the amount received by a brother *to avoid fractions*; of course, any other sum might have been taken.

Do you require any further explanation?

34. F. S.—(1) The answer is correct. You have forgotten to calculate the brokerage on selling out of one stock, and on re-investing in the other. This is distinctly stated in the question.

£81½ in the former stock produces £3;

Selling price without the brokerage = £81½ − £½
= £81;

Price of second stock with brokerage = £136½ + £½
= £136;

$$\therefore 136:81::£:\text{Income in 2nd case.}$$
$$\frac{4}{\cancel{544}}\quad\frac{4}{\cancel{324}}$$
$$\cancel{\pounds 9}\qquad 3$$
$$=£3.$$

You will thus see that the income is the same in each case. How is it that you entirely overlooked the statement of brokerage on each transaction?

(2) The *second* method is correct. The *first* method is entirely wrong.

35. T. H. B.—(1) The solution of your query appeared in our issue for April, 1882.

(2) Write to J. Keefe, Esq., F.S.A., Civil Service Academy, 6, Colquitt Street, Liverpool.

36. BAFFLED.—We cannot see the method of solution of your query. Please give the source from which you derived it.

37. COUNTRY TEACHER.—Get the Science Syllabus, where you will find information. Write to Longmans and Macmillans for the catalogues.

38. ROGO.—As the sum of *five* odd members is an odd number, your query is absurd.

39. JENNIE.—You will find the solution of your query in our issue for October, 1882. It is a question in Arithmetical Progression, and it is given among the Algebraical Queries.

40. ARABI PASHA.—When a legal case is taken into *avizdum* it signifies that the sheriff will consider it further before delivering judgment. It is a Scotch law term.

41. ANXIOUS.—If you have not been a pupil-teacher you cannot sit till you are twenty-one.

42. R. P. SMITH.—You do not state for what examinations you want the books. (1) Mansford's (Hughes). Write to Messrs. Longmans and Co., Macmillan and Co., and Mr. John Murray for their catalogues, where you will find admirable manuals on the subjects you name.

43. JARL.—Write to Rev. Edmund Fowle, Amesbury House, Bickley, Kent. He publishes (through the Messrs. Longmans) a series of books that will meet your wishes. The subject will be dealt with in our new volume.

44. K. S.—The papers will appear in our pages, so you will have an opportunity of judging for yourself.

45. A PERPLEXED ONE.—Apply to Mrs. Floyer, Principal of the London Institute for the Advancement of Plain Needlework, who will doubtless be happy to set your mind at rest.

46. THIRD YEAR.—Get the 'Science and Art Directory,' or write to the Secretary of the S. and A. Department, South Kensington.

47. DAMON AND PYTHIAS.—A Latin PRIMER is not sufficient for Scholarship Examination. You will be glad to hear that this subject will be dealt with in our next number. Yes, a syllabus is published. Order it through any bookseller. Your writing is very fair; the capitals, however, are not *round* enough.

48. WILDHEN.—(1) Consult any Geographical Reader for St. I. (2) We have for a long time used an 'Asbestos' stove, particulars of which will be given you by any respectable ironmonger.

49. AURUM LILY.—About March.

50. ED. DONKIN.—You will find the information in the catalogues published by Messrs. Longmans. and Co., and Messrs. Macmillan and Co. Why don't you buy the Directory?

51. H. G. STYLES.—Write to Mr. J. S. Curwen, Tonic Sol-fa Agency, Warwick Lane, Paternoster Row, E.C.

52. A. B.—On the last Saturday in May, but you should communicate with your inspector.

53. STUDENT.—Skakspere's 'Julius Cæsar' and Bacon's 'Essays' will appear with full notes in our own columns. The following books will be used this year in one of the best metropolitan training colleges. Mrs. Fawcett's 'Political Economy,' 'Complete Manual of Teaching' (National Society), Mackay's 'Intermediate Geography,' Bright's History of England, vol. iii. The Messrs. Chambers publish a good Mensuration.

54. WAMBA.—Get a syllabus through your bookseller. It contains all that you want.

55. EXCISEMAN.—Write to Mr. J. Keefe, Colquitt Chambers, Colquitt Street, Liverpool. See also our advertisements.

56. LARS PORSENA.—Buy a syllabus for yourself. The 'marks' are not now published, though they used to be. See article on 'Our Training Colleges' in our next or a very early number.

57. C. K. F.—Yes, but you should read VERY CAREFULLY Art. 66 of the New Code.

58. CONSTANT READER.—

Myself—Reflexive or reciprocal pers. pron., common gen., sing. num., 1st pers., and obj. case governed by trans. verb *strike*.

Years—Common noun, neut. gen., plur., object. — *the objective of time.*

The Practical Teacher.

A MONTHLY EDUCATIONAL JOURNAL.

To Subscribers.—The *Practical Teacher* is published on the 25th of every month. Price 6d.; post free, 7½d.; sent post free, three months for 1s. 11d.; six months, 3s. 9d.; a year, 7s. 6d.

P. O. Orders should be made payable at Chief Office.

Subscribers not receiving their copies regularly are respectfully requested to write to the Publisher.

It would save time and expense if subscribers when remitting would state exactly what numbers they wish to be sent.

To Correspondents.—All literary communications should be addressed, THE EDITOR OF THE PRACTICAL TEACHER, Pilgrim Street, Ludgate Hill, London, E.C.

Accepted contributions are paid for within twenty-one days of publication.

The Editor cannot return rejected MSS.; authors should therefore retain copies.

TO ADVERTISERS.

Approved, *prepaid*, advertisements will be inserted in the *Practical Teacher* at the following rates:—

	s.	d.
20 words or under	3	0
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32 words and under 64 words	5	0
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For 3rd page of wrapper	5 guineas.
For the page opposite the 3rd page of wrapper	5 guineas.
For the 4th (back) page of wrapper ...	6 guineas.

Parts of a page are charged at a slightly higher rate.—Special quotations will be given for a series.

Portfolios, fitted with elastic bands, for preserving twelve numbers of 'The Practical Teacher,' may now be had. Price 2s. 6d. Orders should be given through booksellers.

Vol. I. of the *Practical Teacher* is now out of print.

Publications Reviewed.

Water, and its Teachings in Chemistry, Physics, and Physiography. A Suggestive Handbook. By C. L. Morgan, F.G.S. London: E. Stanford, 55, Charing Cross.

This is, as it is called, a suggestive handbook, and if well used will be of great value to teachers and others. It takes the form of notes arranged in numbered paragraphs, which notes are intended to supply a framework on which the teacher's instruction shall be founded. The field covered by the notes is a very wide one; the author having tried, as he says in his preface, to 'make the substance (water) illustrate the general principles of inorganic science,' and that these notes should form the 'basis of class instruction in general inorganic science, to run parallel with more special and exact work in chemistry.'

We are thoroughly in sympathy with the plan and principle on which this book is founded. Nothing is more certain than that proceeding from the concrete to the general, is a much safer and more profitable way of teaching than the converse method; and one which commends itself to the youthful mind, as every one must be aware who has tried both plans with a class of young students. Show a boy by some such experiment as that described in paragraph 1,094, how much heat is lost to the thermometer in converting ice into water; and then *deduce* from this and similar experiments your definition of latent heat. His ideas on the subject will be much clearer and more exact than those of the boy whose text-book begins the subject of latent heat with a formal definition of what is meant by the term, and then proceeds to give various illustrations of it.

But although the taking of water, the most universal of material substances, as a peg on which to hang lessons concerning other material substances and forces, is in itself wise, we cannot but think that in this book it is made to teach some things that might have been better taught if some other substances had been chosen.

The arrangement in paragraphs is convenient, especially for reference, but we think that the multiplication of paragraphs has been greatly carried to excess. Thus in the following extract it is difficult to see why the three paragraphs, which form part of one continuous statement should be separated:—

'700. We must now inquire how this (oceanic) circulation is brought about.

'701. The following experiment of Dr. Carpenter shows how, in his opinion, it is caused.

'702. A long tank, with class sides, is filled with water. At one end a piece of ice is wedged in,' etc., etc.

In these days of examinations, it is difficult to see where such a book as this will be accepted as a text-book. It does not conform exactly to the requirements of any examination, and so will doubtless be rejected by very many teachers who have the requirements of examiners or school inspectors before their eyes. But where the master can choose his own syllabus of instruction and wants a text-book which goes in an elementary but scientific and thoroughly accurate manner into the main facts of physical science, he cannot do better than choose the book before us.

It is clearly printed in a large type, and elegantly bound. Although destitute of illustrations, in the hand of a competent teacher who is able to draw fairly well and perform the necessary experiments, this is rather an advantage than otherwise.

Magnetism. By T. P. Treglohan. London: Longmans, Green, and Co.

This is not a book pretending to any originality. It has been written to supply the lack of a text-book for the elementary stage of the Science and Art Department, treating of magnetism under the divisions laid down in the syllabus of the Department.

We have no love for examination text-books, though in this present 'competitive-examination age' they seem to be a necessary evil. They tend to cramp the intellect and convert students into examination-machines. The tendency is to say of all extraneous matter, however interesting and important it may be. 'Oh! that is not required; you need not remember that!' But if special text-books for special examinations are required, the more practical they are made the better; and we are glad to see that at the end of each section of this little book a number of experiments and observations (called

indiscriminately 'experiments') are described, to be performed before the student. The subject is evidently intended to be taught practically as well as theoretically. This feature redeems the book from being a mere collection of definitions and statements as it otherwise would necessarily be. The definitions and statements are clearly made, and the book forms a reliable handbook to the subject of which it treats. The diagrams are well executed, and show the points very well. The book is strongly bound, the stitching, unfortunately, almost encroaching on the printed matter.

Worked Examination Questions in Plane Geometrical Drawing. By T. E. Hulme, F.L.S., F.S.A. London: Longmans, Green, & Co.

The indefatigable Art Master of Marlborough College has, in this latest addition to the list of publications with which his name is already associated, issued a work which will be invaluable to candidates preparing for the Military, the Civil Service, the University Local, or, in fact, for any examination in which a knowledge of plane geometry is required. In this book some 300 problems, selected from the papers set in various examinations and of all degrees of difficulty, are thoroughly worked out. The 'get up' of the publication is excellent, the drawings clear, and the paper and printing all that could be desired. A very good feature is that the diagrams are printed on double pages, which, when unfolded, leave the drawing clear of the book. This is a great boon to the worker, as it relieves him of the worry and annoyance caused by having to constantly turn over page after page when wishing to compare the diagram with the question. Not the least useful part of the book is the preface, in which Mr. Hulme gives many reliable hints to students in this branch of the art.

Electricity. By Robert N. Ferguson, Ph.D. New Edition, revised and extended by James Blyth, M.A., F.R.S. London: W. and R. Chambers.

Although the somewhat laconic title of this excellent little book is in the one word 'Electricity,' that *fidus Achates* Magnetism is considered also, and, with a wisdom that might be followed advantageously by other writers and teachers, is considered first. Perhaps the most useful part of so much of the volume as deals with magnetism is, if we make the comparisons with other works that, *pace* all popular proverbs, are necessary to the critic, the chapter on the chronology of magnetism. The diagrams, without presenting the artistic finish of the more expensive text-books, are the equals of the plates in these latter in the matter of plainness, in its best sense, and accuracy. The units given at the commencement of the work are a wise introduction, whilst the brief but admirably clear chapter on the general principles of dynamics, intercalated in the division of the book that deals with electricity, shows that its author is a good practical teacher. For in dealing with any subject involving a knowledge of certain large fundamental principles that are regarded as pertaining to another branch of knowledge, it is necessary to briefly enumerate those principles, if the work in question is for students. These last younger thinkers will not stop to see if they are familiar with the dynamical principles involved in the study of electricity. They will not pause to verify their presumed knowledge. Hence the practised teacher, with a laudable desire to prevent his readers from floundering hopelessly ere many pages are traversed because they have not taken the trouble to assure themselves as to their knowledge of the meaning of unit-force or trinetic energy, takes the trouble for them, as all good teachers must, and briefly recapitulates the necessary dynamical principles.

A trace of carelessness in the English—or shall we say the British?—language is visible here and there, and more than once or twice terms are used that are only explained on subsequent pages, or not explained at all. The Fahrenheit scale is unfortunately used in the earlier part of the book, though in the later pages it is supplanted by its more worthy companion. In the account of the Holz machine, on page 126, it is to be regretted that the letter E is used for any part of the apparatus, as the author also uses that letter for the word 'electricity' in his description; hence much possibility of confusion on the part of the student. It may be open to question also whether more might not advantageously be said as to the chemistry of the Faure's and Planté's cells, after the excellent discussion on these two forms of battery by Professor J. H. Gladstone, Dr. Tribe, and Dr. Oliver J. Lodge.

But these are only minor blemishes in a work of considerable excellence. That it is level with the most recent advances of electrical science is among its least merits. The photophone and the nomenclature adopted by the International Congress of Electricians at Paris in October of last year are explained in this volume. Some of the explanations are of a rare clearness; notably those that deal with lines of force, with the magnetic field, with the action of the horizontal and vertical constituents of the earth's magnetic force, and with the *vexata questio* of potential. To this last we only take exception on the ground that the analogy of potential with temperature, the best as we think of analogies in this difficult conception, is ignored. From the mathematical side the work is well done. In fact, it is at once a recommendation and a drawback to the book that the treatment of the subject is so largely mathematical—a recommendation because the only rational investigation of magnetic and electrical phenomena must be on a mathematical basis; a drawback in that so few of our physical students bring to their study the essential pre-requisite of an average mathematical training. It is on this ground, and on this ground alone, that we fear only one half of the aim of its author has been attained. He would have his treatise popular and accurate. Accurate it assuredly is. We fear it may not be as popular as it is accurate. But, after all, accuracy is the better half.

A Manual of Greek Verbs. By F. Ritchie, M.A., and E. H. Moore, M.A. London: Rivingtons.

In the preface to this little book the authors state that in it an attempt has been made to arrange in a clear and consecutive order the laws which govern the inflexion of the Greek verb, to supply copious examples of their application, and to collect and group the chief instances of irregularity. They are to be congratulated that the outcome of their labours is the production of a text-book which will be welcomed alike by both teacher and scholar. The book is thoroughly fitted for school use, being both serviceably bound and clearly printed, with every assistance that diversity of type can give to the user, and although, of necessity, in a work on such a subject no great scope is afforded for originality, yet whatever there is in it fresh in the way of arrangement and grouping is judicious and well carried out.

Songs. 'Jo,' 'A Souvenir of Bleak House,' and 'Twilight Memories.' Words and music by Noretta. London: B. Williams, 60, Paternoster Row; each 2s., net.

These songs will add little to the reputation of a firm which has published many really good things. Both words and music of the first suggest their theme only by their poverty. Indeed, the entire song reads like a poor exercise in verbal and musical composition, done without feeling, and with small experience in the use of either vehicle of expression. College men would possibly be ludicrously reminded of the fractional ellipses in some unfortunate 'Criticism Lesson,' by the bisection of 'pau-per' (sic.) by a quaver rest; this, by-the-bye, is a passage marked *tristement*. 'Twilight Memories' is somewhat better. That 'In the Gloaming' is suggested some may deem fortunate; and that the three short verses have each the same setting, while, in both songs, the melody is throughout repeated in the accompaniment, may be considered advantages by any who require but little work and considerable assistance.

English Grammar. By F. A. White, B.A. London: Kegan Paul, Trench, and Co.

Mr. White has here given us an interesting book which, though not in our opinion adapted for school use, will well repay the student for perusal. The author's mode of treating his subject varies considerably from that pursued in most grammars, and though we cannot agree with his views in all cases, we cordially admit that they are stamped with no small amount of originality and learning. In the preface Mr. White states that throughout the book he has made the English language *as it is* the primary consideration, and that, instead of drawing illustrations from the forms occurring in English *as it was*, he has assumed the knowledge of a little Latin and French on the part of his readers, and has drawn his illustrations from those languages. We think this principle a sound and useful one, and wish it had been carried out even to a greater extent than in the little book before us. A grammar compiled in this way would be more likely to prove beneficial to school-boys than one bristling with Anglo-Saxon, Icelandic, and Old English forms (which, however useful they may be to the *student*, only confuse the *young learner*, and the more so, since the mode of spelling these forms varies in different text-books), if only from the fact that the three languages, when so treated, mutually aid one another, and the boy, while pursuing one language, insensibly widens his knowledge of the other two. In looking more critically into Mr. White's book we note the occurrence of many words which, though not met with in most treatises, it is just as well the student should know. The terms 'agglutinative,' 'grammatology,' 'hyperdissyllable,' 'procopé,' 'anuric,' 'onomatopœic,' 'orthopœic,' 'guillemets,' 'monoids,' are a few of these. The force and originality which characterize the author's remarks on some debatable points are likely to prove of service to the student by enabling him to see both sides of the question, and thus prevent him from accepting statements blindly on trust.

Bell's Standard Elocutionist. London: Hodder and Stoughton.

This is a revised, enlarged, and improved edition of an old favourite. When a book has been before the public so long as this, ordinary criticism is needless. Pupil teachers and others will find an abundance of excellent pieces suitable for recitation.

A Treatise on Hydromechanics. Part I. Hydrostatics. By W. H. Besant, M.A., F.R.S. London: Deighton, Bell, and Co.

A comparison of this volume of very recent issue with its predecessors is not uninteresting, as showing the gradual advance in our knowledge and in our treatment of any given branch of science. Mr. W. H. Besant first issued in 1859 a treatise on Hydrostatics and Hydromechanics. The table of contents of the 250 pages of this volume makes no recognition of the two main divisions of Hydromechanics, although the letter-press of the book deals with these two subjects in definite sequence. In 1867, a second edition of 291 pages appeared, the two divisions of the subject being clearly marked off in the table of contents. In 1877, the title of the third edition is the inclusive one of Hydromechanics, and the book extends to 320 pages. And now in 1883, Mr. Besant has to publish his work in two volumes, the first of which, on fluids in equilibrium, comprising 228 pages, is before us. A book that has stood the test of twenty-four years needs little recommendation. Nevertheless, it is at once a duty and a pleasure to say that this new edition surpasses, were that possible, its fellows in clearness and in accuracy. As far as we have been able to investigate, no error of any kind seems to have intruded itself, and all the old charm of Mr. Besant's treatment of mathematics is as noticeable as ever. The admirable series of exercises, many of them original, and all excellently typical and thoughtful, is amplified. In pursuance of his usual plan, the author gives none of the solutions, and in that fact we find the only matter for regret. The book will be of highest service, not alone to Mr. Besant's own pupils, but to all anxious to make acquaintance with the mathematics of fluids through an introduction at the hands of one of our most accomplished mathematicians.

Shakspere's 'King Richard II.' With Notes. (Blackie's School Classics.) London: Blackie and Son.

This is in every respect an excellent little book, well adapted for school use by its clear print and simple arrangement. The text of the play is preceded by a short introduction, descriptive of that part of English history with which the plot is connected, and the notes, which are capital in their way, being concise and carefully compiled, are placed at the end of the book. The omission of Aumerle (afterwards Rutland), son of the Duke of York, from the genealogical table is probably an oversight.

The Imperial Drawing Books. London: Thomas Murby.

This is a well-arranged and well-brought-out series, and is likely to prove useful for both school and home work. It consists of three books, the first two providing material for training in class and for individual work, and the third containing a series of tests for ascertaining what progress the pupil has made. The paper used is much above the average, and the examples, which number twenty-four in the book now before us (the first of the series), are extremely well drawn and clearly printed. The directions appended to each figure or copy will prove very serviceable to those without a master, and, in fact, impart far more information than the drawing master can as a rule find time to give.

(1) Illustrated Readings in Holy Scripture: The Life of Christ. (2) Bible Cartoons. London: Wesleyan Methodist Sunday School Union.

These consist of a series of cartoons of considerable size, suitable for hanging on the walls of Sunday and other schools, and only need to be known to be appreciated. The drawings are the work of Mr. W. Gunston, an artist of no mean merit, as the forcible pose and grouping of the figures throughout the whole series abundantly testify. Effectiveness is given to the designs by the employment of a monochrome background, in the case of the Bible Cartoons, gilt; in the others, a neutral tint. The figures, lined in on a ground of a light terra-cotta colour, are by this means shown up in a very striking manner.

Imperial Chart of the World on Mercator's Projection. Edinburgh and London: W. and A. K. Johnston.

Too much importance can hardly be attached to the use of Mercator's Projection in teaching geography, for not only is it the most convenient map on which to give simple lessons in latitude and longitude, but also it is the only map on which the track of a ship, always steering the same course, appears as a straight line, and on which the position of places, with respect to each other, is the same as on the globe itself. The specimen of this chart now before us is an excellent production; it is well and clearly printed, and the tints employed (of which the register is perfect), without being so heavy as to interfere with the legibility of the names, are decided enough for all purposes of distinction. The names inserted appear to have been carefully selected to embrace all the most important places on the earth's surface which could be mentioned in a map of the size without sacrificing legibility.

Reference Chart for English Parsing and Analysis. Compiled by R. W. Hinton, B.A. Manchester and London: John Heywood.

This chart is clearly printed in white on a black ground, and since the arrangement is good and the schemes of

parsing and analysis easy to be understood, is likely to prove of great service to the teacher. Mr. Hinton, the compiler, is the headmaster of the Haberdashers' Company's school at Hoxton, and has evidently carried out in this wall-sheet the plan he has found by experience to be most advisable. We have ourselves found a chart of this description most useful in class work, especially in dealing with children in whom, to speak phrenologically, the bump of locality is strongly developed. In the minds of such children a fact or statement may very often be fixed merely by the memory of its position in reference to others on the blackboard or chart.

The Lord's Prayer. Illuminated in colours. Edinburgh and London: W. and A. K. Johnston.

This is a splendid example of what chromo-lithography can do when applied to illumination. The design, worked out in gold, silver, and colours, is bold and effective, and at the same time elaborate in detail. We know of no more fitting ornament for the walls of nursery or bedroom than this 'Our Lord's Prayer.'

Notes.

ON our title-page we have the pleasure to publish the prospectus of our new volume, which we think bids fair to be the best of the three. We have made several important changes in the bill of fare, and hope the feast as now set forth will be to the taste of our guests.

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A word of counsel to our young friends:—Prove yourselves worthy trenchermen when you come to the dishes containing Mr. Capel's Latin Lessons and Dr. Newsholme's Physiology, and may good *digestion* wait on appetite. Years hence, when rejoicing in the mature strength of manhood, you will thank us for the hint.

***

Two important alterations have been made in the rules connected with our Query Column,—the one is, that the real name and address of the writer must be written on a SEPARATE piece of paper, and the pseudonym put at the end of the query; and the other, that no query can be answered in the following issue unless it reaches our office on THE 12TH INSTANT. We have altered the date with a view to reply to *every* query sent, so as not to disappoint our readers. If a query is held over, the sender may rest assured that there is a valid reason for the delay.

***

We desire to draw our friends' attention to another prospectus, that of the *Governess*, which faces the third page of wrapper. This journal is now issued as a *penny weekly*, and, though primarily designed for schoolmistresses, will prove a valuable help to all engaged in teaching. Many of the articles are from the pens of well-known teachers of the ripest experience.

***

An effort has been made to send a copy to every schoolmistress in the kingdom, and if by any mishap any of our readers have not received their copies, we shall be happy to send others upon receipt of a post-card bearing the address.

***

Teachers would be doing us good service by showing the paper to their colleagues and assistants, many of whom would doubtless be glad to 'take in' the *Governess* if they only knew its character.

Publications Received.

Arithmetic—
(1) The National Arithmetic. Standards I. to VII. National Society.
(2) Answers to Four Rules of Arithmetic. Longmans.
(3) Ellery's Course of Arithmetic. Standards III. and IV. With Book of Answers. Chambers.

Elocution—
(1) Bell's Standard Elocutionist (Revised). Hodder and Stoughton.

English Literature—
(1) Merchant of Venice. Bell and Sons.
(2) Julius Cæsar. Bell and Sons.

Euclid—
(1) Euclid Sheets. Relfe Bros.

Foreign Classics—
(1) Picciola. Part X. B. Saintine. G. Bell and Sons.

Grammar—
(1) The National Grammar. Standards II., III., IV. and V. National Society.

History—
(1) The French Revolution, 1789-1795. By E. M. Gardiner. Longmans.
(2) A Concise English History. By Lupton. Longmans.
(3) Historical Ballads. Parts I. and II. National Society.

Latin—
(1) Selections for Latin Prose Composition. By R. M. Millington. Longmans.

Maps, Diagrams, etc.
(1) Chart of the World. A. Johnston.
(2) The Lord's Prayer. A. Johnston.
(3) Reference Chart for English Parsing and Analysis. Mounted on Rollers. John Heywood.
(4) A Series of Penny Outline Maps. Longmans.

Mensuration—
(1) Mensuration for Beginners and Answers. Murby.

Mental Arithmetic—
(1) The Pupil's Mental Arithmetic. Blackie and Son.

Miscellaneous—
(1) The Old Waggon; or, the Old Life and the New. John Heywood.
(2) The Stage in the Drawing-room. Griffith and Farran.
(3) The Work of a Sunday School Superintendent. National Society.
(4) A Pamphlet on Moral Education. John Groom.
(5) The English Constitution. By S. Amos. Longmans.
(6) China Painting Made Easy. John Heywood.

Music—
(1) Twilight Memories. By Noretta. B. Williams.
(2) A Souvenir of Bleak House 'Jo'. By Noretta. B. Williams.

Periodicals and Magazines—
(1) Amateur Work. Part XIV. Ward, Lock, and Co.
(2) Longman's Magazine. No. 3. Longmans.
(3) Cassell's Book of Sports and Pastimes. Part X. Cassell and Co.
(4) Universal Instructor. Part XXVII. Ward, Lock, and Co.
(5) Our Little Ones. Vol. III. No. 3. Griffith and Farran.

Poetry—
(1) Poetry for Standards. Standards I. to VII. Griffith and Farran.
(2) New National Poetry Cards. Standards I., II., III. and IV. National Society.

Readers—
(1) Graduated Readers. Book III. Chambers.
(2) The World at Home. Standard I. Nelson and Sons.
(3) History Readers. No. 1. Marcus Ward and Co.
(4) History Readers. No. 2. Marcus Ward and Co.
(5) Geography Reading Books. Standards I., II., and V. National Society.
(6) Botany Reading Books. Part II. National Society.
(7) Geographical Reader. No. 3. Blackie and Son.
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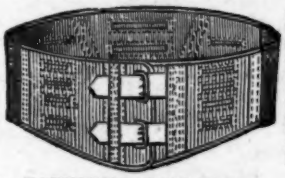

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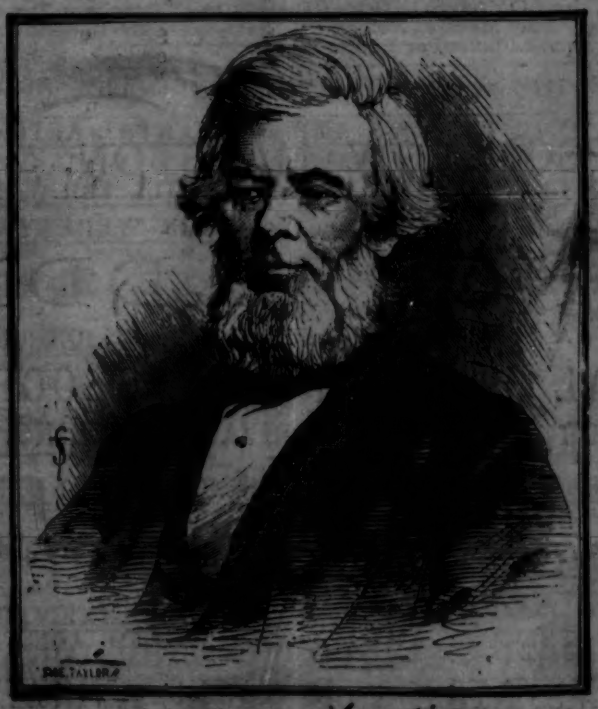

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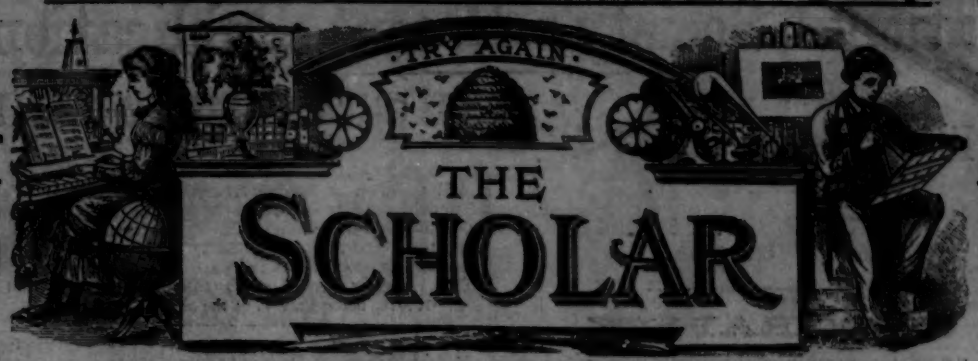

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